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LED TV

SERVICE MANUAL

CHASSIS : LD33P

MODEL : 26LN46** 26LN46**-Z*

CAUTION

BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



P/NO : MFL67782201 (1304-REV00)

Printed in Korea

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by \triangle in the Schematic Diagram and Exploded View.

It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.

Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 M Ω and 5.2 M Ω .

When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.

Connect 1.5 K / 10 watt resistor in parallel with a 0.15 μ F capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.

Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which corresponds to 0.5 mA.

In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω

*Base on Adjustment standard

SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the **SAFETY PRECAUTIONS** on page 3 of this publication.

NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;

- Removing or reinstalling any component, circuit board module or any other receiver assembly.
- Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
- Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.

CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

- Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".
- Do not spray chemicals on or near this receiver or any of its assemblies.
- Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10 % (by volume) Acetone and 90 % (by volume) isopropyl alcohol (90 % - 99 % strength)
- CAUTION:** This is a flammable mixture. Unless specified otherwise in this service manual, lubrication of contacts is not required.
- Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
- Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
- Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead. Always remove the test receiver ground lead last.
- Use with this receiver only the test fixtures specified in this service manual.

CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

- Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.

- After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
- Use only a grounded-tip soldering iron to solder or unsolder ES devices.
- Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
- Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
- Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
- Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
- CAUTION:** Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
- Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

- Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range of 500 °F to 600 °F.
- Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
- Keep the soldering iron tip clean and well tinned.
- Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25 cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
- Use the following unsoldering technique
 - Allow the soldering iron tip to reach normal temperature. (500 °F to 600 °F)
 - Heat the component lead until the solder melts.
 - Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.**CAUTION:** Work quickly to avoid overheating the circuit board printed foil.
- Use the following soldering technique.
 - Allow the soldering iron tip to reach a normal temperature (500 °F to 600 °F)
 - First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
 - Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.**CAUTION:** Work quickly to avoid overheating the circuit board printed foil.
- Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor

Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device

Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor

Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.

3. Solder the connections.

CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. Carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.

CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

- This specification is applied to the LED TV used LD33P chassis.
- NetCast4.0 MTK, Model List(apply this Product Specification)

T/C/S2		T2/C/S2	
Pan EU	CIS(except UR/AK)	Pan EU	CIS(except UR/AK)
26LN460R/7-ZJ	26LN460R/7-ZJ	26LN460U-ZJ	26LN460U-ZJ
29LN460R/7-ZJ	29LN460R/7-ZJ	29LN460U-ZJ	29LN460U-ZJ

2. Requirement for Test

Each part is tested as below without special appointment.

- 1) Temperature: 25 °C ± 5 °C(77 °F ± 9 °F), CST: 40 °C ± 5 °C
- 2) Relative Humidity: 65 % ± 10 %

3) Power Voltage

: Standard input voltage (AC 100-240 V~, 50/60 Hz)

* Standard Voltage of each products is marked by models.

4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.

5) The receiver must be operated for about 20 minutes prior to the adjustment.

3. Test method

1) Performance: LGE TV test method followed

2) Demanded other specification

- Safety : CE, IEC specification
- EMC : CE, IEC
- Wireless : Wireless HD Specification (Option)

4. Model General Specification

No.	Item	Specification	Remarks
1	Market	EU(PAL Market-36Countries)	<p>DTV & Analog (Total 37 countries) DTV (MPEG2/4, DVB-T) : 30 countries Germany, Netherland, Switzerland, Hungary, Austria, Slovenia, Bulgaria, France, Spain, Italy, Belgium, Russia, Luxemburg, Greece, Czech, Croatia, Turkey, Morocco, Ireland, Latvia, Estonia, Lithuania, Poland, Portugal, Romania, Albania, Bosnia, Serbia, Slovakia, Beralus</p> <p>DTV (MPEG2/4, DVB-T2) : 7 countries UK, Sweden, Denmark, Finland, Norway, Ukraine, Kazakhstan, Ireland</p> <p>DTV (MPEG2/4, DVB-C) : 37 countries Germany, Netherland, Switzerland, Hungary, Austria, Slovenia, Bulgaria, France, Spain, Italy, Belgium, Russia, Luxemburg, Greece, Czech, Croatia, Turkey, Morocco, Ireland, Latvia, Estonia, Lithuania, Poland, Portugal, Romania, Albania, Bosnia, Serbia, Slovakia, Beralus, UK, Sweden, Denmark, Finland, Norway, Ukraine, Kazakhstan</p> <p>DTV (MPEG2/4,DVB-S) : 30 countries Germany, Netherland, Switzerland, Hungary, Austria, Slovenia, Bulgaria, France, Spain, Italy, Belgium, Russia, Luxemburg, Greece, Czech, Croatia, Turkey, Morocco, Ireland, Latvia, Estonia, Lithuania, Poland, Portugal, Romania, Albania, Bosnia, Serbia, Slovakia, Beralus</p> <p>Supported satellite : 22 satellites HISPASAT 1C/1D, ATLANTIC BIRD 2, NILESAT 101/102, ATLANTIC BIRD 3, AMOS 2/3, THOR 5/6, IRIUS 4, EUTELSAT-W3A, EUROBIRD 9°, EUTELSAT-W2A, HOTBIRD 6/8/9, EUTELSAT-SESAT, ASTRA 1L/H/M/KR, ASTRA 3°/3B, BADR 4/6, ASTRA 2D, EUROBIRD 3, EUTELSAT-W7, HELLASSAT 2, EXPRESS AM1, TURKSAT 2°/3°, INTERSAT10</p>

No.	Item	Specification	Remarks
2	Broadcasting system	1) PAL-BG 2) PAL-DK 3) PAL-I/I' 4) SECAM L/L', DK, BG, I 5) DVB-T 6) DVB-C 7) DVB-T2 8) DVB-S	DVB-S: Satellite
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM, QAM	<p>► DVB-T</p> <ul style="list-style-type: none"> - Guard Interval(Bitrate_Mbit/s) 1/4, 1/8, 1/16, 1/32 - Modulation : Code Rate QPSK : 1/2, 2/3, 3/4, 5/6, 7/8 16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 <p>► DVB-T2</p> <ul style="list-style-type: none"> - Guard Interval(Bitrate_Mbit/s) 1/4, 1/8, 1/16, 1/32, 1/128, 19/128, 19/256, - Modulation : Code Rate QPSK : 1/2, 2/5, 2/3, 3/4, 5/6 16-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 64-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 256-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 <p>► DVB-C</p> <ul style="list-style-type: none"> - Symbolrate : 4.0Msymbols/s to 7.2Msymbols/s - Modulation : 16QAM, 64-QAM, 128-QAM and 256-QAM <p>► DVB-S/S2</p> <ul style="list-style-type: none"> - symbolrate DVB-S2 (8PSK / QPSK) : 2 ~ 45Msymbol/s DVB-S (QPSK) : 2 ~ 45Msymbol/s - viterbi DVB-S mode : 1/2, 2/3, 3/4, 5/6, 7/8 DVB-S2 mode : 1/2, 2/3, 3/4, 3/5, 4/5, 5/6, 8/9, 9/10
4	Scart (1EA)	PAL, SECAM	Scart jack is Full scart and support ATT/DTV-OUT (not support DTV Auto AV)
5	Video Input (1EA)	PAL, SECAM, NTSC4.43	4 System : PAL, SECAM, NTSC, PAL60 Phone jack type
6	Head phone out	Antenna, AV1, AV2, Component, HDMI1, HDMI2, USB1, USB2, USB3	
7	Component Input (1EA)	Y/Cb/Cr Y/Pb/Pr	Phone jack type
8	HDMI Input (2EA)	HDMI1-DTV HDMI2-DTV	Support HDMI-PC mode (HDMI1/2) - INPUT LABEL : PC HDMI1 : MHL / HDMI2 : ARC
9	Audio Input (3EA)	PC Audio Component/AV2 AV1	
10	USB (3EA)	EMF, DivX HD, For SVC (download), HDD, HUB	JPEG, MP3, DivX HD
11	Ethernet Connect(1EA)	Ethernet Connect	

5. Component Video Input (Y, C_B/P_B, C_R/P_R)

No.	Resolution	H-freq(kHz)	V-freq(Hz)	Proposed
1	720×480	15.73	60.00	SDTV, DVD 480i
2	720×480	15.63	59.94	SDTV, DVD 480i
3	720×480	31.47	59.94	480p
4	720×480	31.50	60.00	480p
5	720×576	15.625	50.00	SDTV, DVD 625 Line
6	720×576	31.25	50.00	HDTV 576p
7	1280×720	45.00	50.00	HDTV 720p
8	1280×720	44.96	59.94	HDTV 720p
9	1280×720	45.00	60.00	HDTV 720p
10	1920×1080	31.25	50.00	HDTV 1080i
11	1920×1080	33.75	60.00	HDTV 1080i
12	1920×1080	33.72	59.94	HDTV 1080i
13	1920×1080	56.250	50	HDTV 1080p
14	1920×1080	67.5	60	HDTV 1080p

6. HDMI Input

6.1. DTV mode

No.	Resolution	H-freq(kHz)	V-freq.(kHz)	Proposed
1.	640*480	31.469 / 31.5	59.94/60	SDTV 480P
2.	720*480	31.469 / 31.5	59.94 / 60	SDTV 480P
3.	720*576	31.25	50	SDTV 576P
4.	720*576	15.625	50	SDTV 576i
5.	1280*720	37.500	50	HDTV 720P
6.	1280*720	44.96 / 45	59.94 / 60	HDTV 720P
7.	1920*1080	33.72 / 33.75	59.94 / 60	HDTV 1080i
8.	1920*1080	28.125	50.00	HDTV 1080i
9.	1920*1080	26.97 / 27	23.97 / 24	HDTV 1080P
10.	1920*1080		25	HDTV 1080P
11.	1920*1080	33.716 / 33.75	29.976 / 30.00	HDTV 1080P
12.	1920*1080	56.250	50	HDTV 1080P
13.	1920*1080	67.43 / 67.5	59.94 / 60	HDTV 1080P

6.2. PC mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Proposed
1	640 x 350 @70Hz	31.468	70.09	EGA
2	720 x 400 @70Hz	31.469	70.08	DOS
3	640 x 480 @60Hz	31.469	59.94	VESA(VGA)
4	800 x 600 @60Hz	37.879	60.317	VESA(SVGA)
5	1024 x 768 @60Hz	48.363	60.004	VESA(XGA)
6	1152 x 864 @60Hz	54.348	60.053	VESA
7	1360 x 768 @60Hz	47.712	60.015	VESA(WXGA)

ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LED TV with LD33P chassis.

2. Designation

- (1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.
- (2) Adjustment must be done in the correct order.
- (3) The adjustment must be performed in the circumstance of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ of temperature and $65\% \pm 10\%$ of relative humidity if there is no specific designation.
- (4) The input voltage of the receiver must keep AC 100-240 V~, 50/60 Hz.
- (5) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15.

In case of keeping module is in the circumstance of 0°C , it should be placed in the circumstance of above 15°C for 2 hours.

In case of keeping module is in the circumstance of below -20°C , it should be placed in the circumstance of above 15°C for 3 hours.

[Caution]

When still image is displayed for a period of 20 minutes or longer (Especially where W/B scale is strong. Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area.

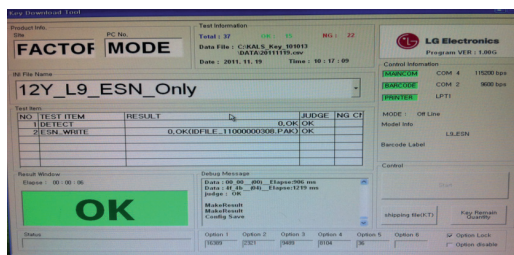
3. Automatic Adjustment

3.1. MAC address D/L, CI+ key D/L, Widevine key D/L, ESN D/L

Connect: USB port

Communication Prot connection

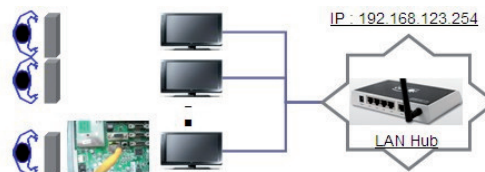
- Com 1,2,3,4 and 115200(Baudrate)
- Mode check: Online Only
- Check the test process: DETECT -> MAC -> CI -> Widevine -> ESN -> HDCP14 -> HDCP20
- Play: Press Enter key
- Result: Ready, Test, OK or NG
- Printer Out (MAC Address Label)



3.2. LAN Inspection

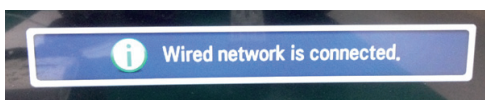
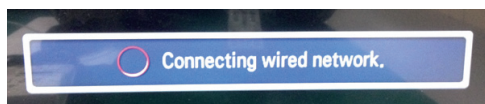
3.2.1. Equipment & Condition

- Each other connection to LAN Port of IP Hub and Jig

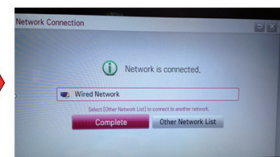
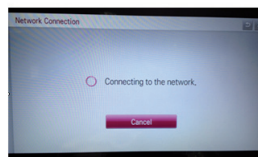


3.2.2. LAN inspection solution

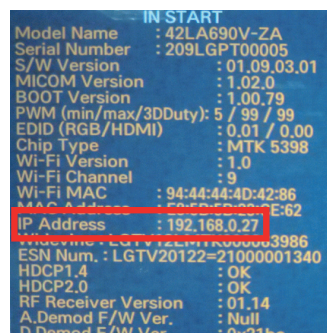
- LAN Port connection with PCB
- Setting automatic IP



- If you want manual connection, enter Network connection at MENU Mode of TV. Press Start connection key, then Network will be connected.

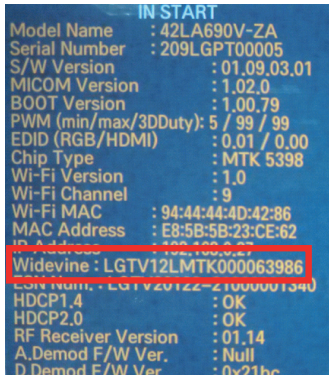


- Setting state confirmation
- If automatic setting is finished, you confirm IP and MAC Address at 'in start' menu mode.



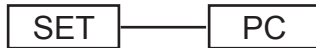
3.2.3. WIDEVINE key Inspection

- Confirm key input data at the "IN START" MENU Mode.



3.3. LAN PORT INSPECTION(PING TEST)

Connect SET → LAN port == PC → LAN Port



3.3.1. Equipment setting

- (1) Play the LAN Port Test PROGRAM.
- (2) Input IP set up for an inspection to Test Program.
*IP Number : 12.12.2.2

3.3.2. LAN PORT inspection(PING TEST)

- (1) Play the LAN Port Test Program.
- (2) Connect each other LAN Port Jack.
- (3) Play Test (F9) button and confirm OK Message.
- (4) Remove LAN cable.



3.4. Model name & Serial number Download

3.4.1. Model name & Serial number D/L

- Press "P-ONLY" key of service remote control.
(Baud rate : 115200 bps)
- Connect RS-232C Signal to USB Cable to USB.
- Write Serial number by use USB port.
- Must check the serial number at Instart menu.

3.4.2. Method & notice

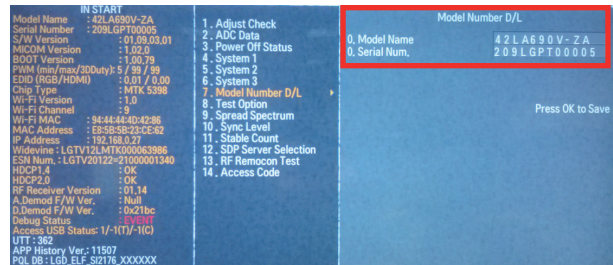
- (1) Serial number D/L is using of scan equipment.
- (2) Setting of scan equipment operated by Manufacturing Technology Group.
- (3) Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0.

* Manual Download (Model Name and Serial Number)

If the TV set is downloaded by OTA or service man, sometimes model name or serial number is initialized.(Not always)

It is impossible to download by bar code scan, so It need Manual download.

- 1) Press the "Instart" key of Adjustment remote control.
- 2) Go to the menu "7.Model Number D/L" like below photo.
- 3) Input the Factory model name(ex 42LA690V-ZA) or Serial number like photo.



- 4) Check the model name Instart menu. → Factory name displayed. (ex 42LA690V-ZA)
- 5) Check the Diagnostics.(DTV country only) → Buyer model displayed. (ex 42LA690V-ZA)

3.5. CI+ Key checking method

- Check the Section 3.1

Check whether the key was downloaded or not at 'In Start' menu. (Refer to below).



=> Check the Download to CI+ Key value in LGset.

3.5.1. Check the method of CI+ Key value

- (1) Check the method on Instart menu
- (2) Check the method of RS232C Command
 - 1) Into the main ass'y mode(RS232: aa 00 00)

CMD 1	CMD 2	Data 0
A	A	0 0

- 2) Check the key download for transmitted command (RS232: ci 00 10)

CMD 1	CMD 2	Data 0
C	I	1 0

- 3) Result value
 - Normally status for download : OKx
 - Abnormally status for download : NGx

3.5.2. Check the method of CI+ key value(RS232)

- 1) Into the main ass'y mode(RS232: aa 00 00)

CMD 1	CMD 2	Data 0
A	A	0 0

- 2) Check the method of CI+ key by command (RS232: ci 00 20)

CMD 1	CMD 2	Data 0
C	I	2 0

- 3) Result value
 - i 01 OK 1d1852d21c1ed5dcx
 - CI+ Key Value

3.6. WIFI MAC ADDRESS CHECK

- (1) Using RS232 Command

	H-freq(kHz)	V-freq.(Hz)
Transmission	[A][I][Set ID][20][Cr]	[O][K][X] or [NG]

- (2) Check the menu on in-start

```

IN START
Model Name : GLOBAL-PLAT4
Serial Number : SKJY1107
S/W Version : 01.24.01.01
MICOM Version : 1.02.8
BOOT Version : 1.00.58
FRC Version : 0.63
LG1132/LG5812 Ver. : 0x0e / 0x0c
PWM (min/max/3DDuty): 5 / 80 / 100
EDID (RGB/HDMI) : 0.8f / 0.8f
Chip Type : LG 1152
Wi-Fi Version : 1.0
Wi-Fi Channel : 0
Wi-Fi MAC : 00:1E:B2:C3:07:45
MAC Address : 12:12:12:12:12:12
IP Address : 0.0.0.0
Widevine : LGTV12LLGE000000524
L-Dimming/SR Ver. : 00.48/0x13
RF Receiver Version : 03.36
A.Demod F/W Ver. : 0x20b2f
D.Demod F/W Ver. : 0x107
Debug Status : DEBUG
Access USB Status: 0/0(T)/0(C)
UTT : 4
APP History Ver.: 25682
Eye Q Gain : 5000
POL DB : LGD_ALEF_S12173_XXXXXX
  
```

4. Manual Adjustment

* ADC adjustment is not needed because of OTP(Auto ADC adjustment)

4.1. EDID DATA

4.1.1. HDMI1

128 B	256 B	Summary	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01	01	01
0x01	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26		
0x02	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	01	01		
0x03	01	01	01	01	01	01	66	21	50	B0	51	00	1B	30	40	70		
0x04	36	00	40	84	63	00	00	1E	64	19	00	40	41	00	26	30		
0x05	18	88	36	00	40	84	63	00	00	18	00	00	00	FD	00	3A		
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	00	FC		
0x07	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	76		

4.1.2. HDMI2

128 B	256 B	Summary	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01	01	01
0x01	01	17	01	03	80	A0	5A	78	0A	EE	91	A3	54	4C	99	26		
0x02	0F	50	54	A1	08	00	31	40	45	40	61	40	71	40	01	01		
0x03	01	01	01	01	01	01	66	21	50	B0	51	00	1B	30	40	70		
0x04	36	00	40	84	63	00	00	1E	64	19	00	40	41	00	26	30		
0x05	18	88	36	00	40	84	63	00	00	18	00	00	00	FD	00	3A		
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20	00	00	00	FC		
0x07	00	4C	47	20	54	56	0A	20	20	20	20	20	20	20	01	76		

	HDMI1	HDMI2
HDMI1	76	E2
HDMI2	76	D2

4.2. White Balance Adjustment

4.2.1. Overview

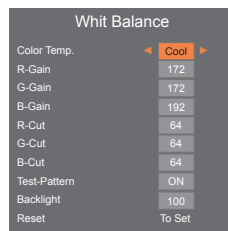
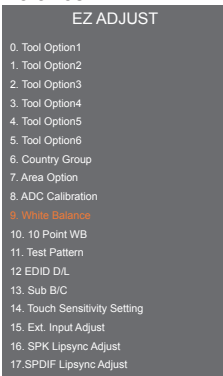
- RGB Gains are fixed data for each model.
- Insert RS-232C Jack which is connected with PC for White
→ Total Assembly line should be check whether the color coordinate(x, y) data refer to below table were meet or not.

Color Temperature	Cool	13,000	K	X=0.270 (±0.03) Y=0.271 (±0.03)	<Test Signal> Inner pattern (204gray,80IRE)
	Medium	9,300	K	X=0.285 (±0.03) Y=0.293 (±0.03)	
	Warm	6,500	K	X=0.313 (±0.03) Y=0.329 (±0.03)	
Luminance (cd/m²)	Cool	Min : 80	K	Typ : 160	<Test Signal> Inner pattern (204gray,80IRE)
	Medium	Min : 80	K	Typ : 160	
	Warm	Min : 70	K	Typ : 160	

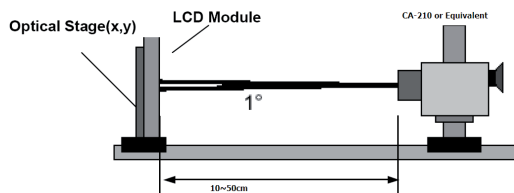
* Note : x,y coordinates are drifted about 0.007 after 30 mins heat-run. So checking color coordinate within 5-min at total assembly line, consider x,y coordinates might be up to 0.007 than x,y target of each color temperature.

* Note : Manual W/B process using adjusts Remote control.

- 1) After enter Service Mode by pushing "ADJ" key,
- 2) Enter "White Balance" by pushing "▶" key at "White Balance".



* When doing Adjustment, Please make circumstance as below.



4.3. Magic Motion Remote control test

- Dogle Ready

- (1) Equipment : RF Remote control for test, IR-KEY-Code Remote control for test
- (2) You must confirm the battery power of RF-Remote control before test(recommend that change the battery per every lot)
- (3) Sequence (test)
 - 1) if you select the "Start(Wheel)" key on the Adjustment remote control, you can pairing with the TV SET.
 - 2) You can check the cursor on the TV Screen, when select the "Wheel" key on the Adjustment remote control.
 - 3) You must remove the pairing with the TV Set by select "Mute" key on the Adjustment remote control

4.4. 3D function test

(Pattern Generator MSHG-600, MSPG-6100[Support HDMI1.4])

* HDMI mode NO. 872 , pattern No.83

- (1) Please input 3D test pattern like below.



- (2) When 3D OSD appear automatically, then select OK key.



- (3) Don't wear a 3D Glasses, check the picture like below.



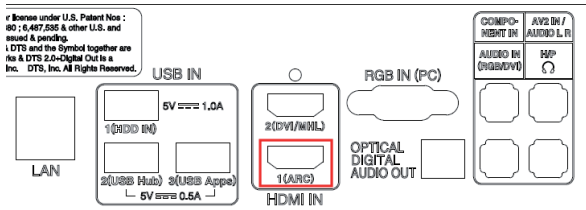
4.5. HDMI ARC Function Inspection

(1) Test equipment

- Optic Receiver Speaker
- MSHG-600 (SW: 1220 ↑)
- HDMI Cable (for 1.4 version)

(2) Test method

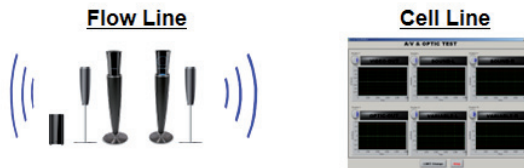
- 1) Insert the HDMI Cable to the HDMI ARC port from the master equipment (HDMI1)



- 2) Check the sound from the TV Set



- 3) Check the Sound from the Speaker or using AV & Optic TEST program (It's connected to MSHG-600)



- * Remark: Inspect in Power Only Mode and check SW version in a master equipment



4.6. Wi-Fi Test

Step 1) Turn on TV

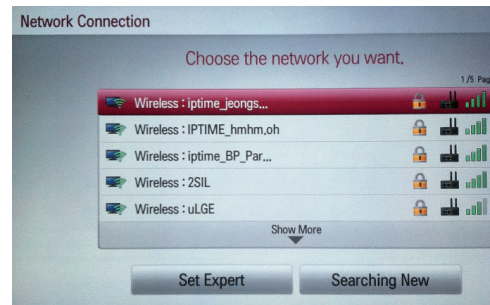
Step 2) Select Network Connection option in Network Menu.



Step 3) Select Start Connection button in Network Connection.



Step 4) If the system finds any AP like blow PIC, it is working well.



4.7. LNB voltage and 22KHz tone check

(only for DVB-S/S2 model)

▪ Test method

- (1) Set TV in Adj. mode using POWER ON.
- (2) Connect cable between satellite ANT and test JIG.
- (3) Press Yellow key(ETC+SWAP) in Adj Remote control to make LNB on.
- (4) Check LED light 'ON' at 18 V menu.
- (5) Check LED light 'ON' at 22 KHz tone menu.
- (6) Press Blue key(ETC+PIP INPUT) in Adj Remote control to make LNB off.
- (7) Check LED light 'OFF' at 18 V menu.
- (8) Check LED light 'OFF' at 22 KHz tone menu.

▪ Test result

- (1) After press LNB On key, '18 V LED' and '22 KHz tone LED' should be ON.
- (2) After press LNB OFF key, '18 V LED' and '22 KHz tone LED' should be OFF.

4.8. Option selection per country

4.8.1. Overview

- Option selection is only done for models in Non-EU

4.8.2. Method

- (1) Press ADJ key on the Adj. R/C, then select Country Group Meun
- (2) Depending on destination, select Country Group Code 04 or Country Group EU then on the lower Country option, select US, CA, MX. Selection is done using +, - or ►◄ key.

4.9. Tool Option selection

- Method : Press "ADJ" key on the Adjustment remote control, then select Tool option.

4.10. Ship-out mode check(In-stop)

- After final inspection, press "IN-STOP" key of the Adjustment remote control and check that the unit goes to Stand-by mode.

4.11. GND and Internal Pressure check

4.11.1. Method

- (1) GND & Internal Pressure auto-check preparation
 - Check that Power cord is fully inserted to the SET.
(If loose, re-insert)
- (2) Perform GND & Internal Pressure auto-check
 - Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process.
 - Connect D-terminal to AV JACK TESTER
 - Auto CONTROLLER(GWS103-4) ON
 - Perform GND TEST
 - If NG, Buzzer will sound to inform the operator.
 - If OK, changeover to I/P check automatically.
(Remove CORD, A/V form AV JACK BOX.)
 - Perform I/P test
 - If NG, Buzzer will sound to inform the operator.
 - If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process.

4.11.2. Checkpoint

- TEST voltage
 - GND: 1.5 KV / min at 100 mA
 - SIGNAL: 3 KV / min at 100 mA
- TEST time: 1 second
- TEST POINT
 - GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND
 - Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL
- LEAKAGE CURRENT: At 0.5 mArms

5. Audio

No.	Item	Min	Typ	Max	Unit	Remark
1.	Audio practical max Output, L/R (Distortion=10% max Output)	9	10	12	W	EQ Off AVL Off Clear Voice Off
			8.10	10.8	Vrms	
2.	Speaker (8Ω Impedance)	9	10	12	W	EQ Off AVL Off Clear Voice Off

Measurement condition:

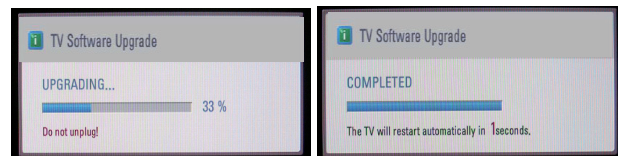
- (1) RF input: Mono, 1 KHz sine wave signal, 100 % Modulation
- (2) CVBS, Component: 1 KHz sine wave signal 0.5 Vrms
- (3) RGB PC: 1 KHz sine wave signal 0.7 Vrms

6. USB S/W Download(Service only)

- (1) Put the USB Stick to the USB socket.
- (2) Automatically detecting update file in USB Stick.
 - If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting.
(Download Version High & Power only mode, Set is automatically Download)
- (3) Show the message "Copying files from memory".



- (4) Updating is starting.



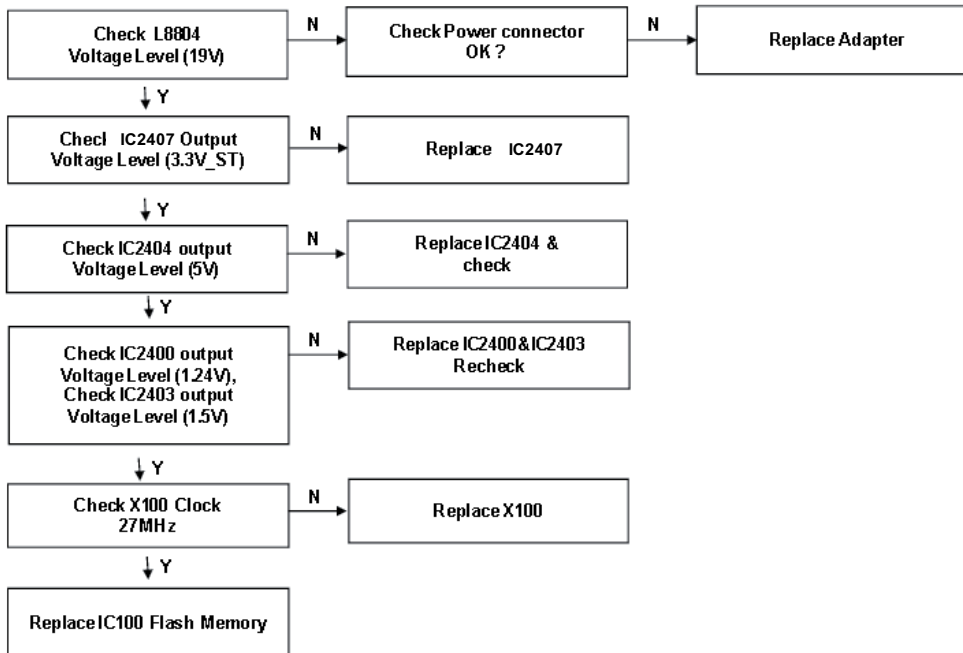
- (5) Updating Completed, The TV will restart automatically.
 - (6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)
- * If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, have to adjust Tool Option again.

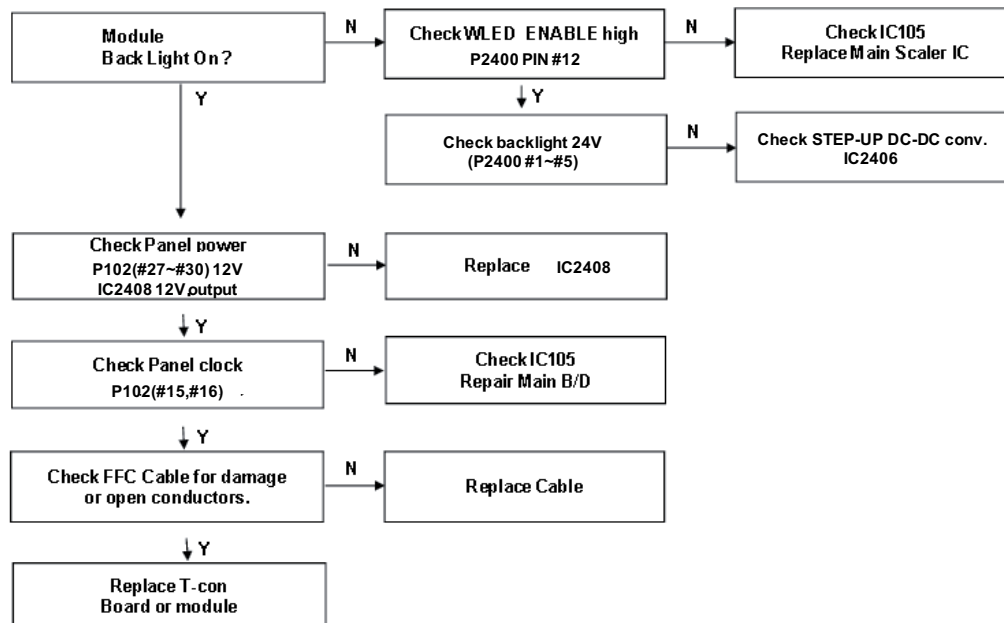
- (1) Push "IN-START" key in service remote control.
- (2) Select "Tool Option 1" and push "OK" key.
- (3) Punch in the number. (Each model has their number)

TROUBLE SHOOTING GUIDE

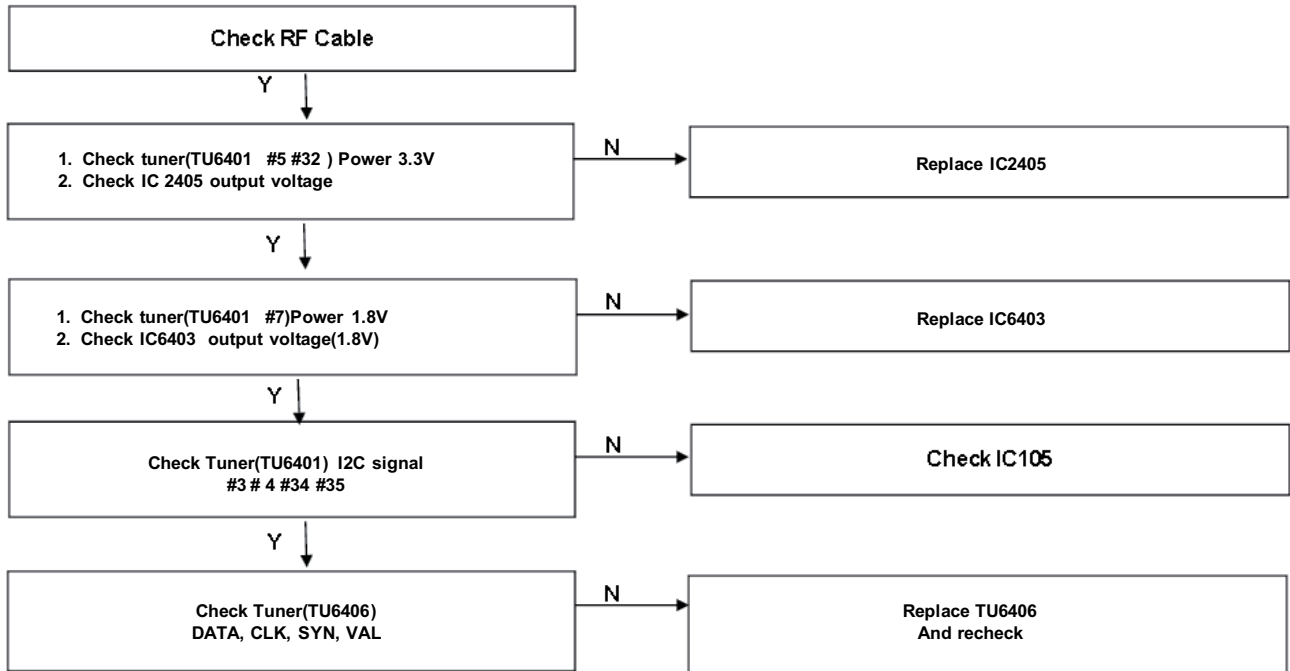
No Power



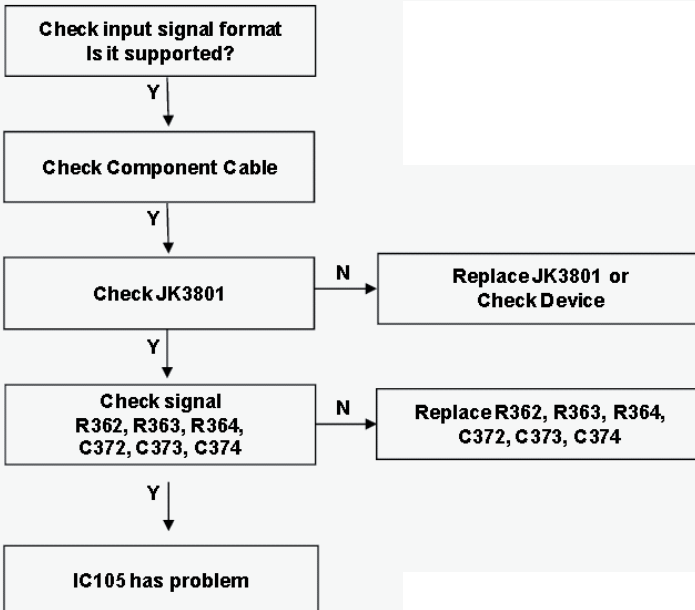
No Picture



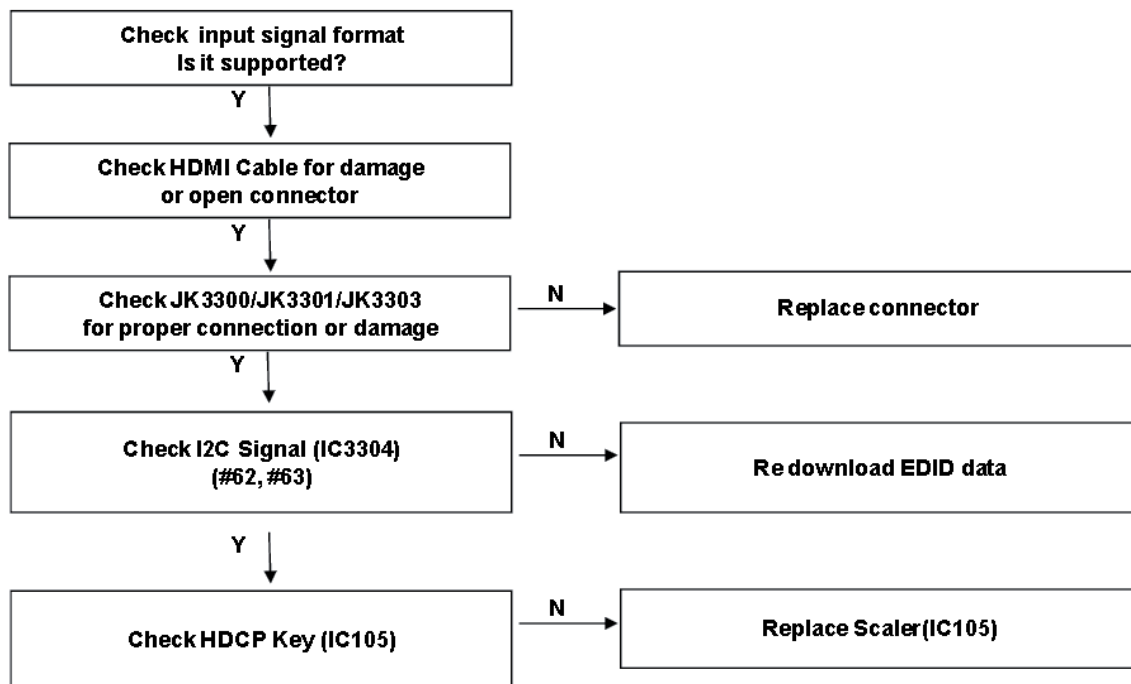
No Video - Digital TV



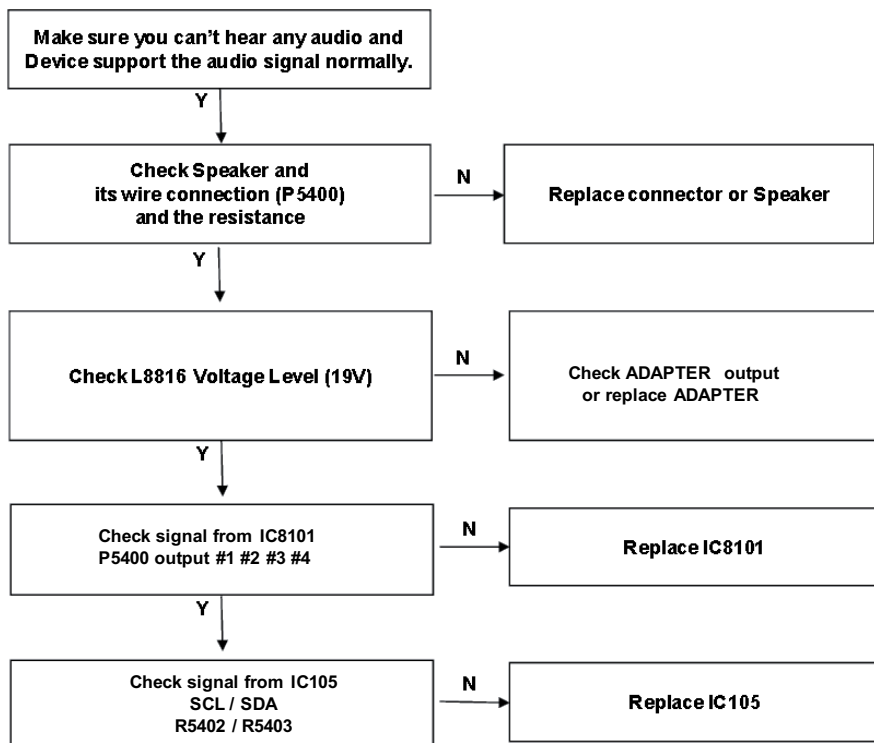
No Video - Component



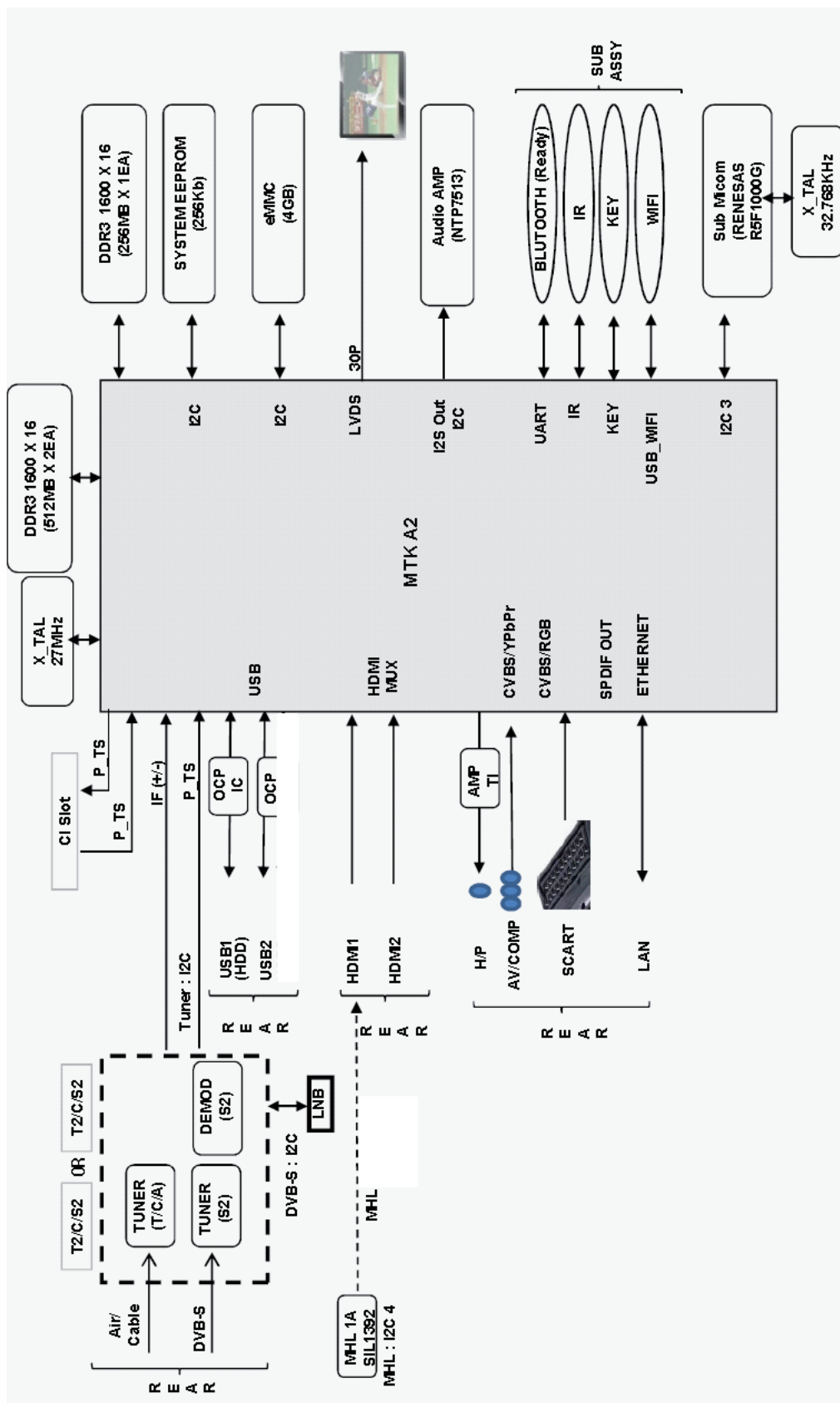
No Video - HDMI



No Audio



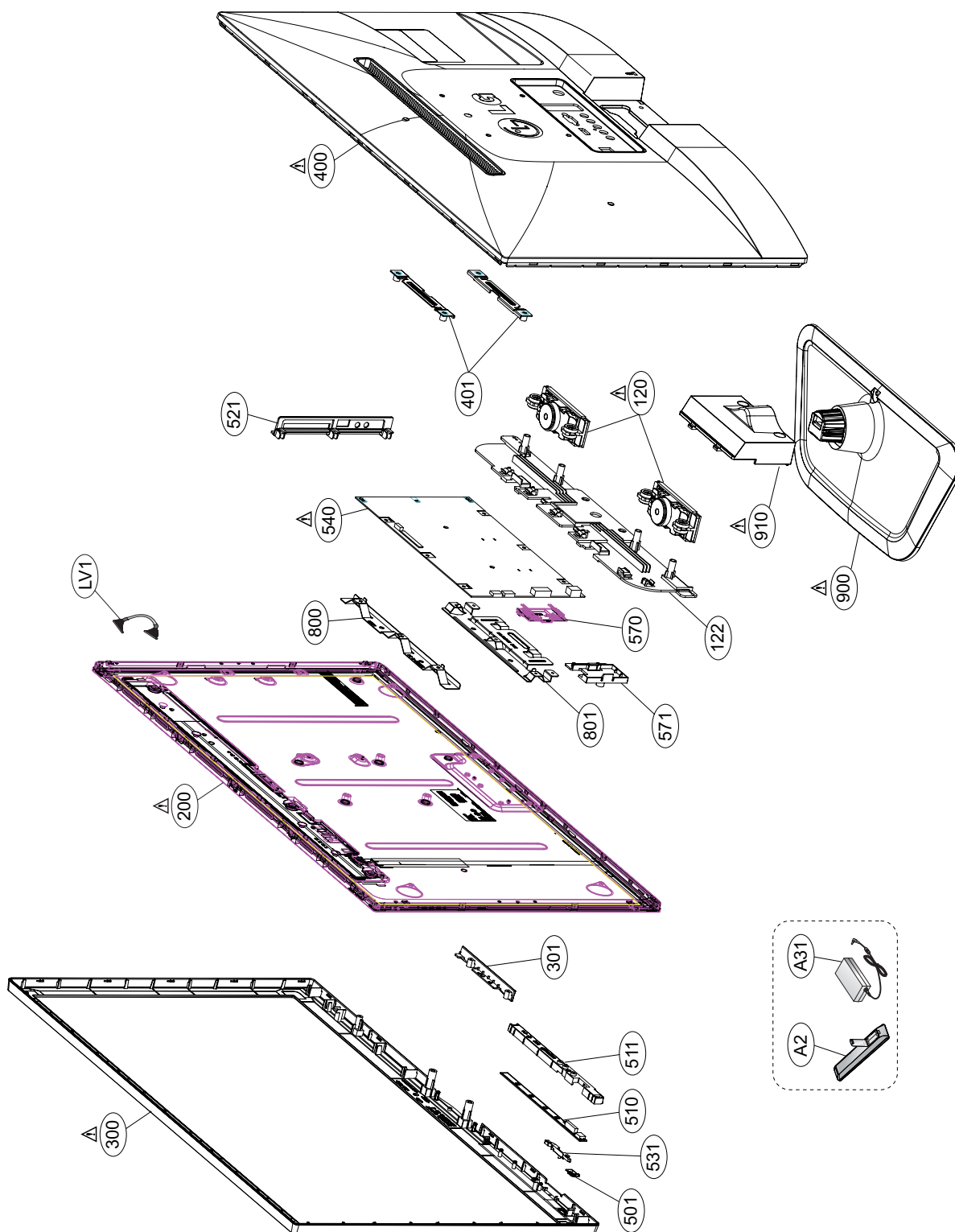
BLOCK DIAGRAM

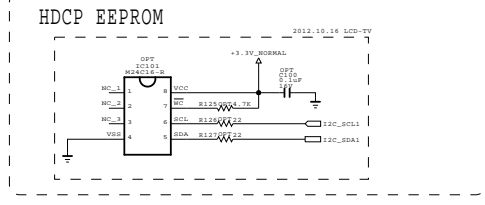
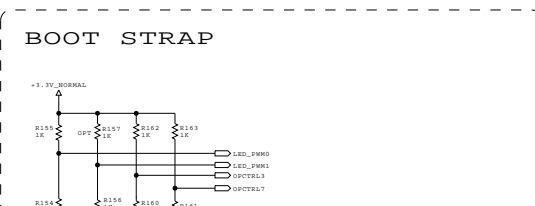
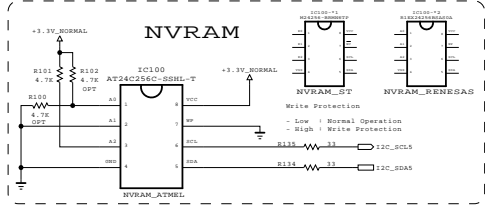
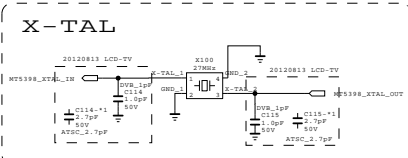
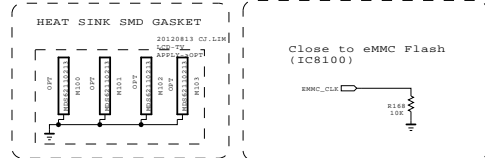


EXPLODED VIEW

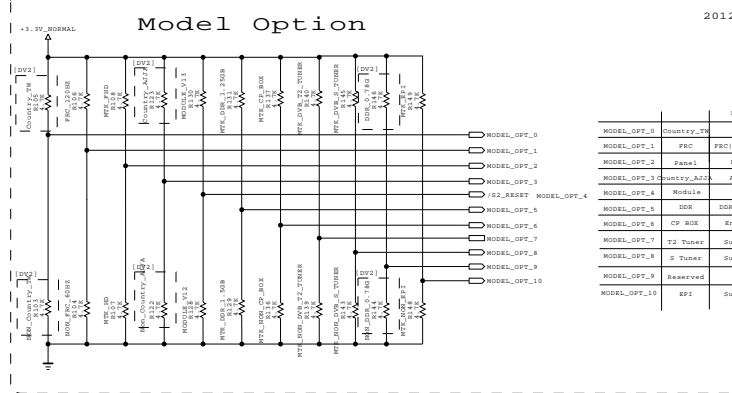
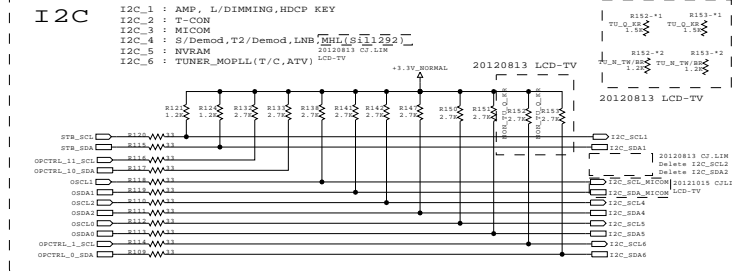
IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by Δ in the Schematic Diagram and EXPLODED VIEW. It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards. Do not modify the original design without permission of manufacturer.

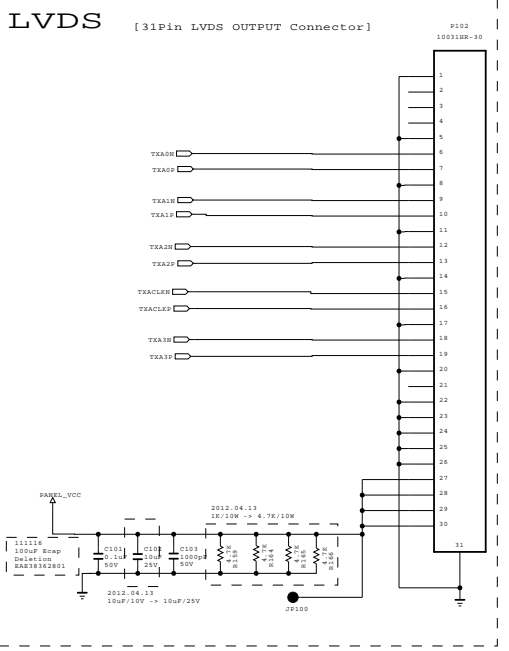
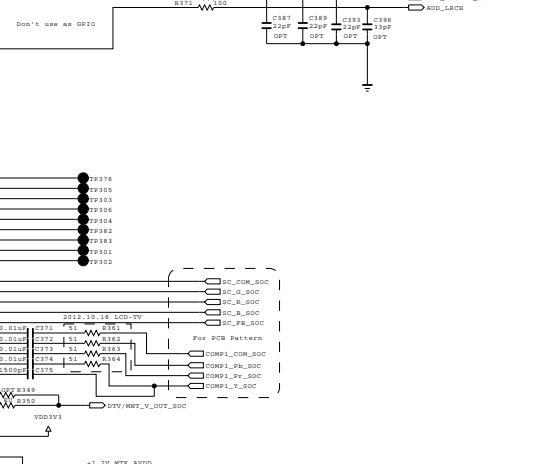
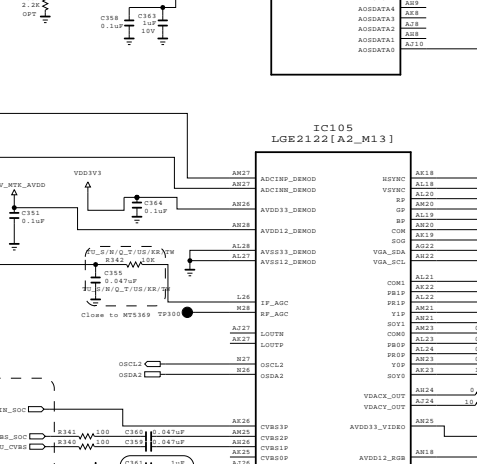
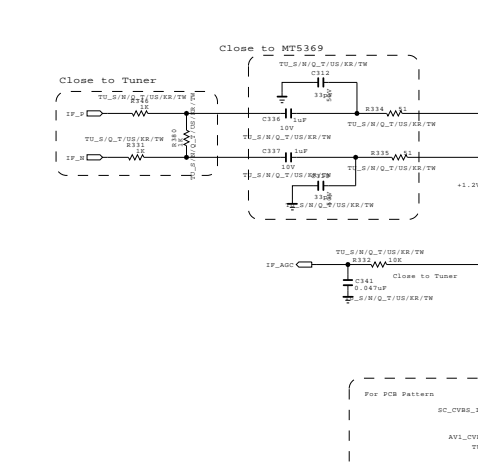
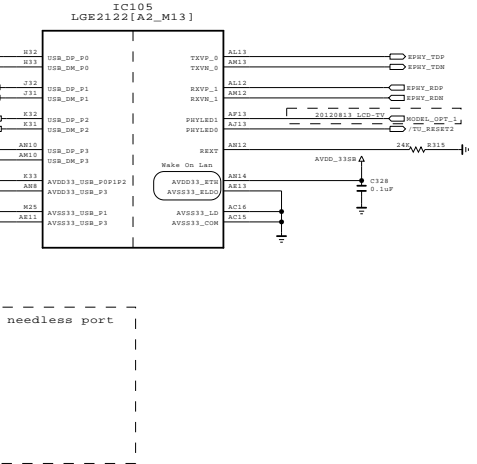
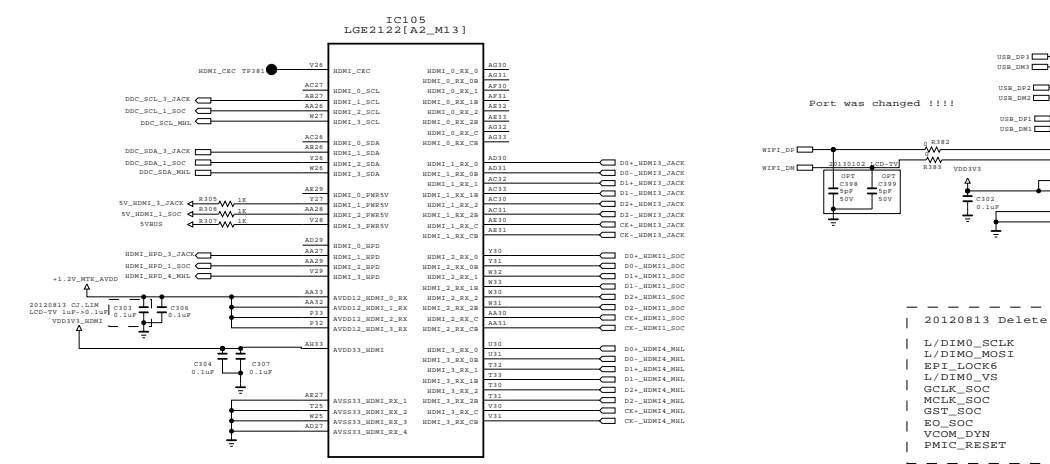




STRAPPING	LED_PWM0	LED_PWM1	OPTCTRL3	OPTCTRL5
ICR mode + 27M + serial boot	1	0	0	1
ICR mode + 27M + ROM to Boot boot	1	0	0	1
ICR mode + 27M + ROM to eMMC Boot boot	1	0	1	0
ICR mode + 27M + ROM to eMMC Boot from eMMC plane (Latched ROM w/o ROM)	1	0	1	1
ICR mode + 27M + ROM to eMMC Boot from eMMC plane	1	1	0	0



MODEL	OPTION	Country	TV	Wn	Low
MODEL_OPT_0	Country	TV	Wn	Low	
MODEL_OPT_1	PRC	PRC(1308A)	Wn	PRC(1308A)	
MODEL_OPT_2	Panel	PRD	RD		
MODEL_OPT_3	Country	A2A	Wn	AG2A	
MODEL_OPT_4	Model	V28	Wn		
MODEL_OPT_5	Model	USK-1.350	USK-1.350		
MODEL_OPT_6	CP ROM	Scrabble	Disable		
MODEL_OPT_7	T2 Tuner	Support	Not Support		
MODEL_OPT_8	3 Tuner	Support	Not Support		
MODEL_OPT_9	Demoview	Default			
MODEL_OPT_10	3 Tuner	Support	Not Support		

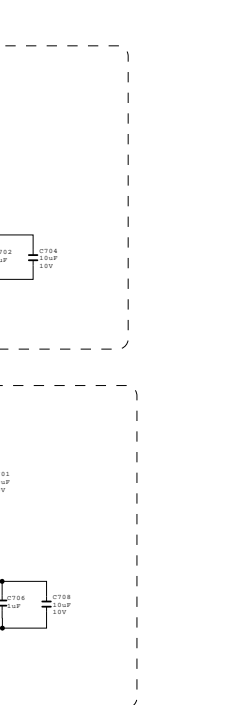
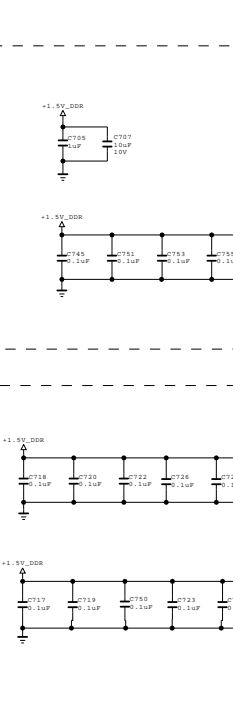
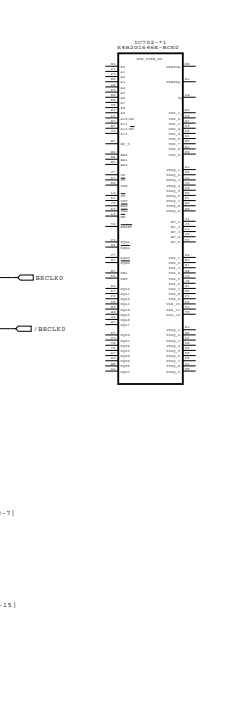
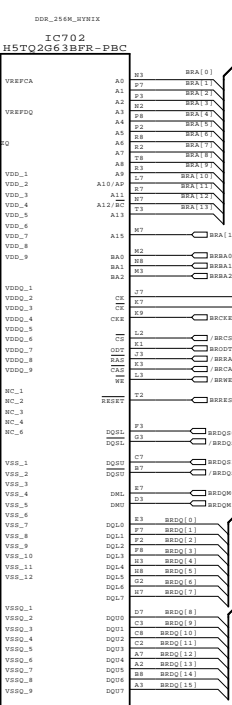
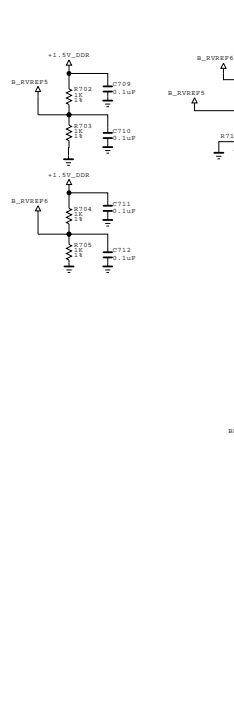
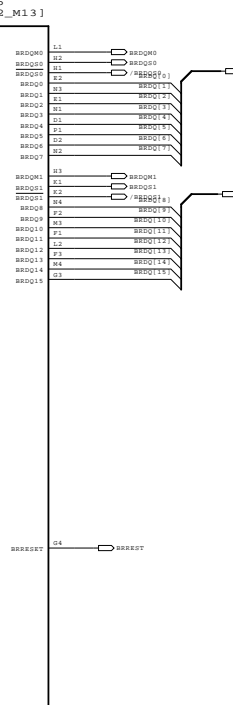
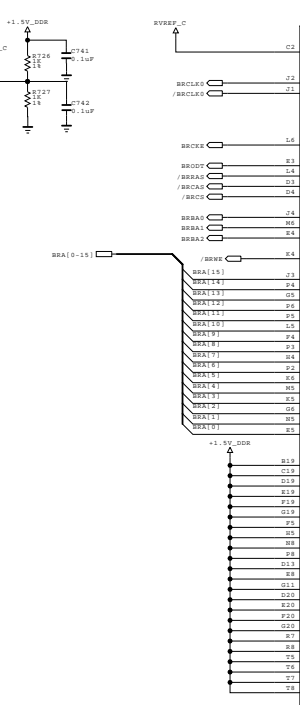
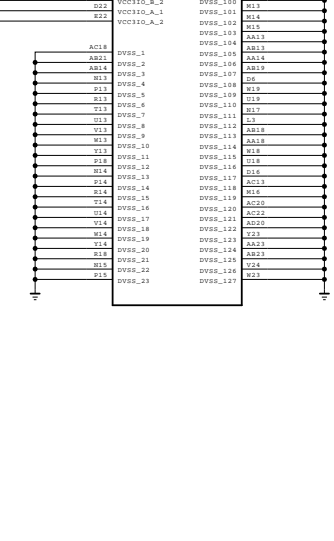
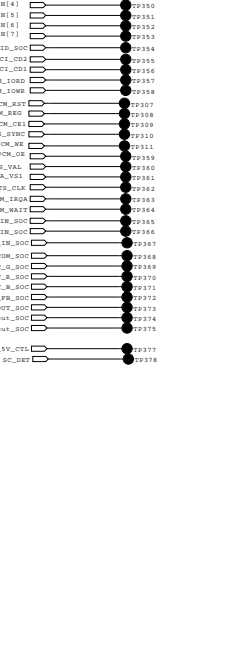
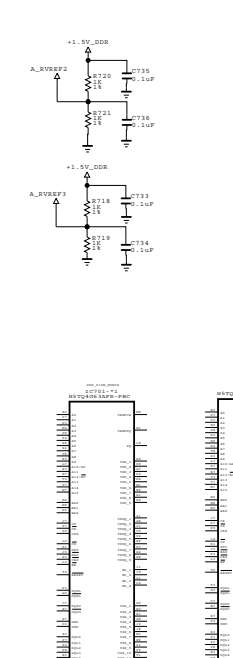
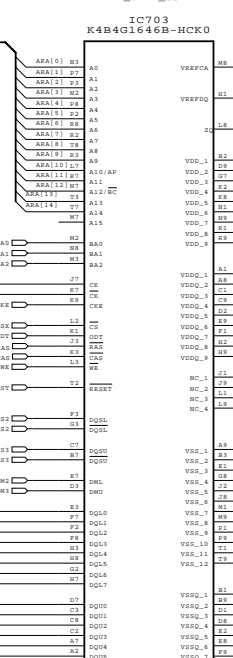
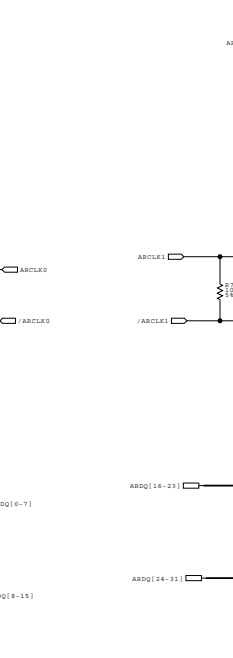
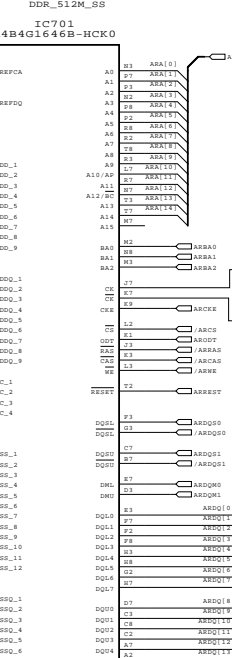
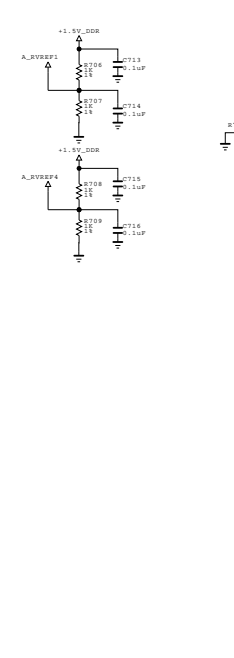
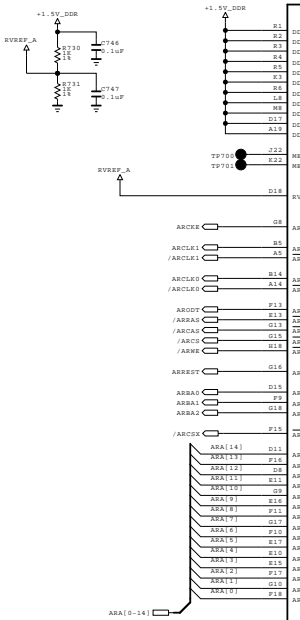
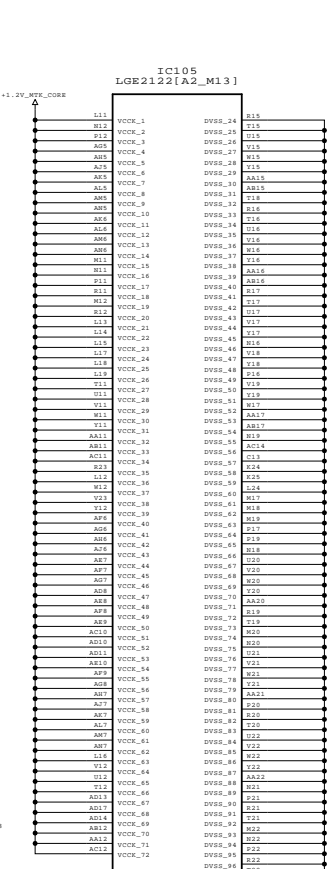
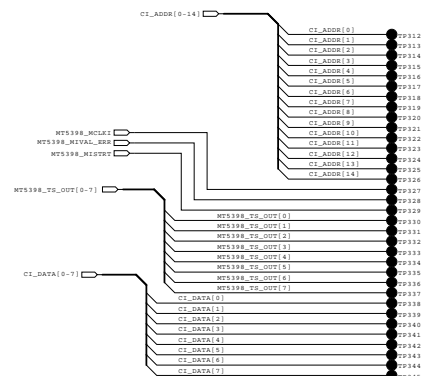
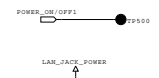
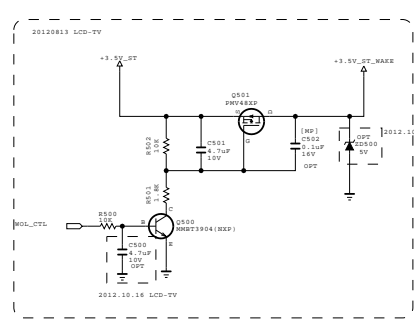
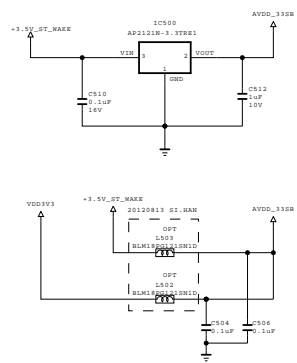
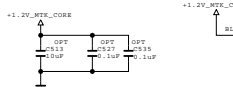
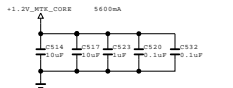
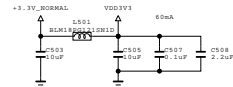
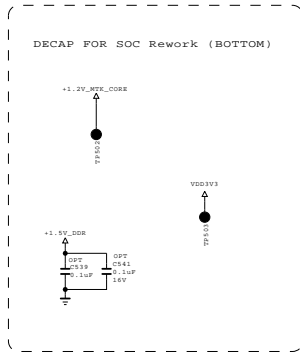
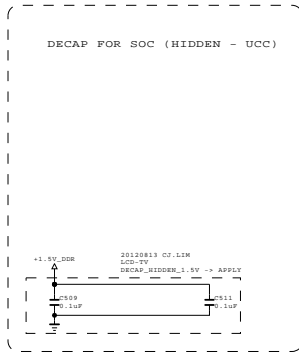




THE SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE SYMBOL MARK OF THE SCHEMATIC.

SECRET
LGElectronics



MODEL	LN4600	DATE	2013.01.02
BLOCK	MAIN	SHEET	1 / 8

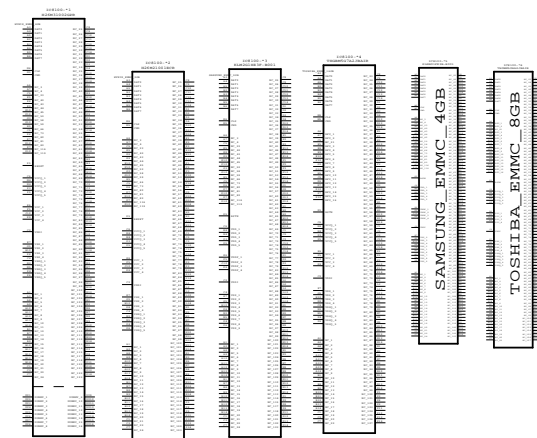
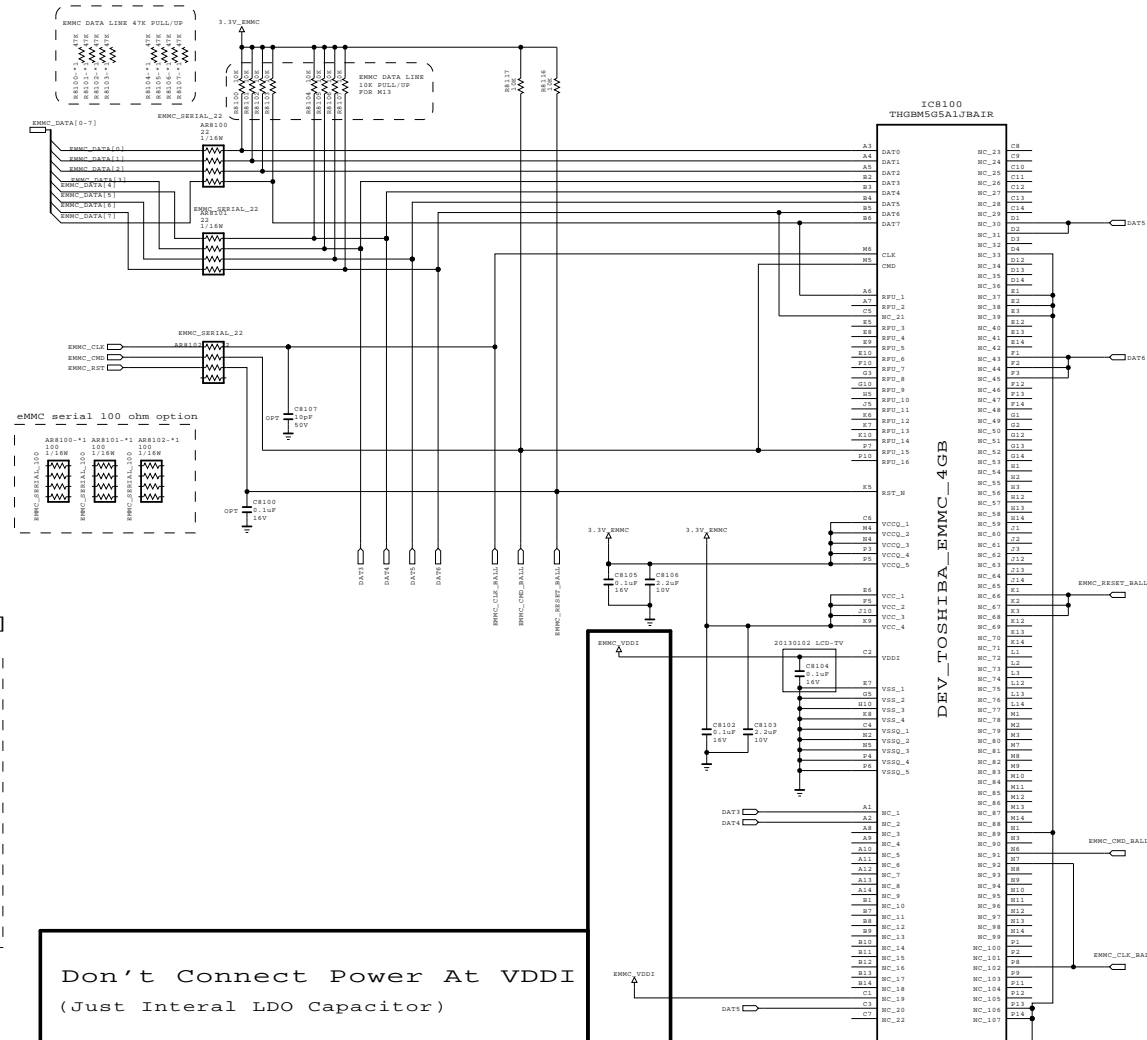
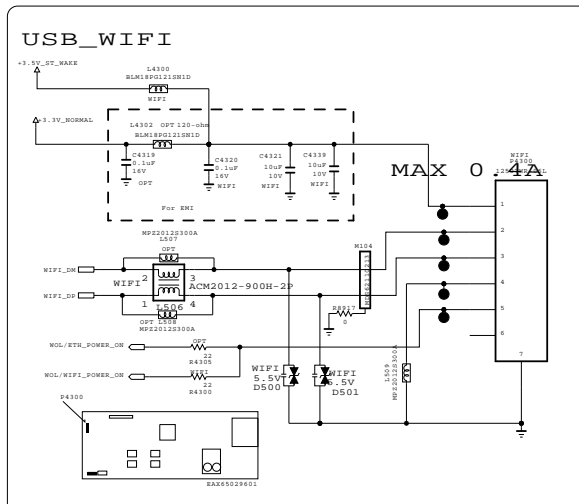
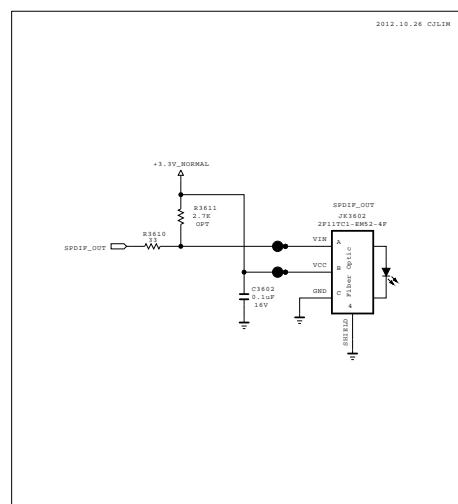
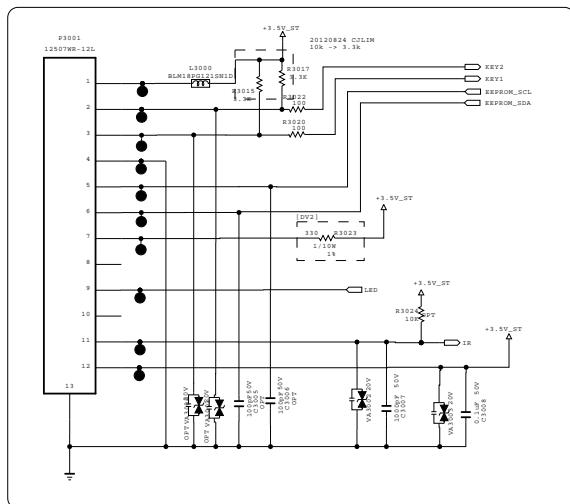
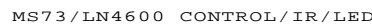
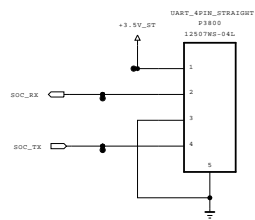
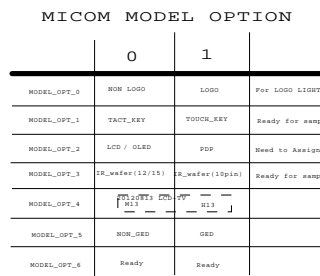
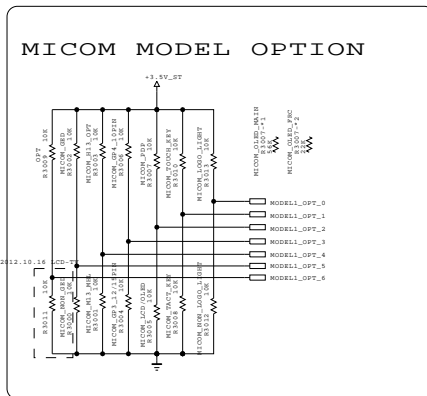
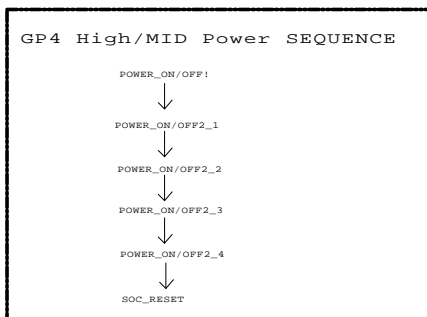
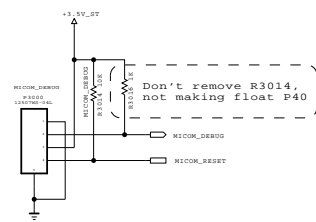




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SECRET
LGElectronics

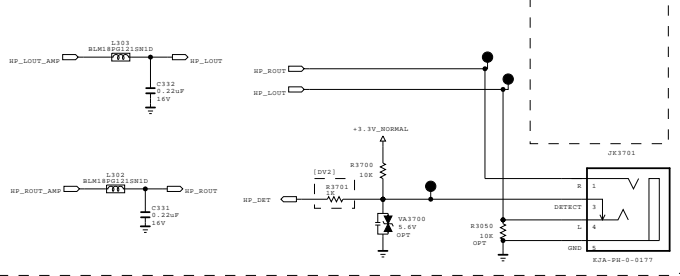
LG ELECTRONICS

MODEL	LN4600	DATE	2013.01.02
BLOCK	MAIN/DDR	SHEET	2 / 8

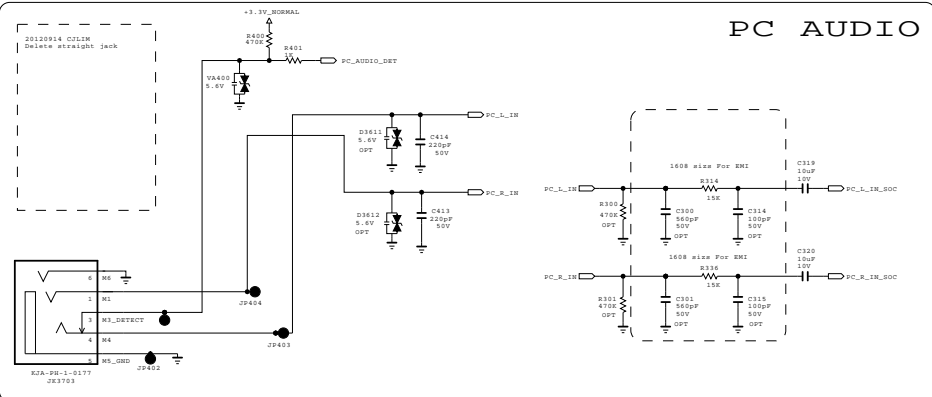


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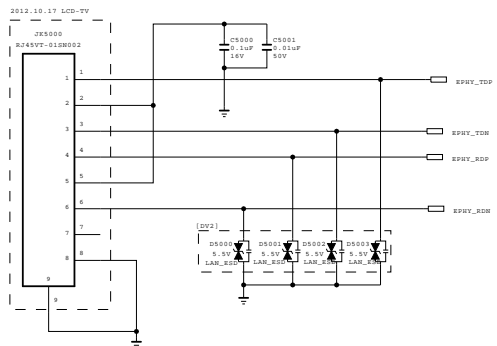
HP OUT



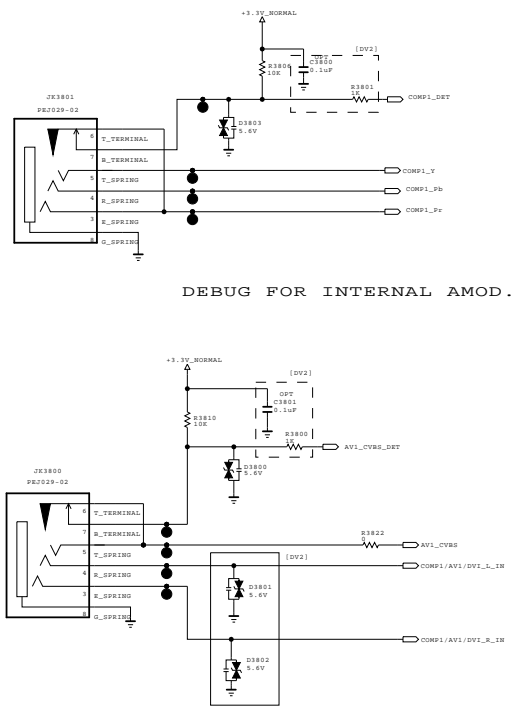
PC AUDIO



Ethernet Block



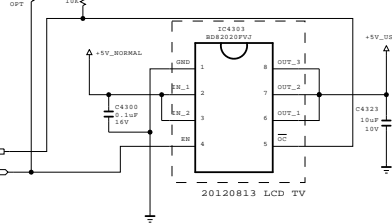
AV/COMPONENT REAR



DEBUG FOR INTERNAL AMOD.

USB Interface

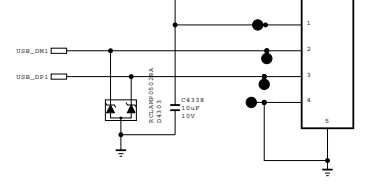
OCP USB1



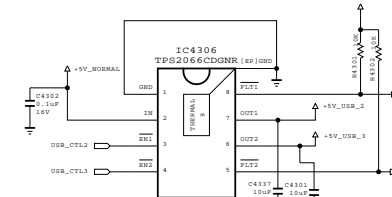
USB1

DVR Ready

MAX 1.8A

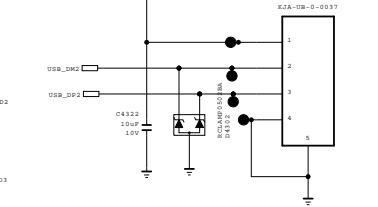


OCP USB2/3



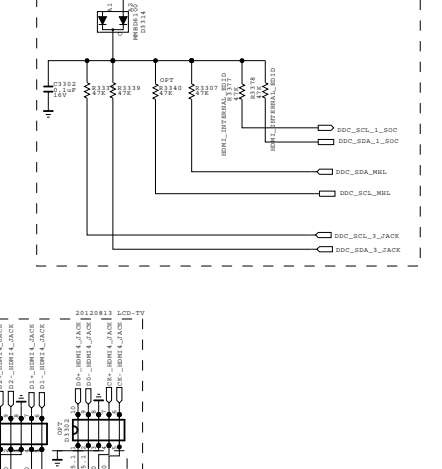
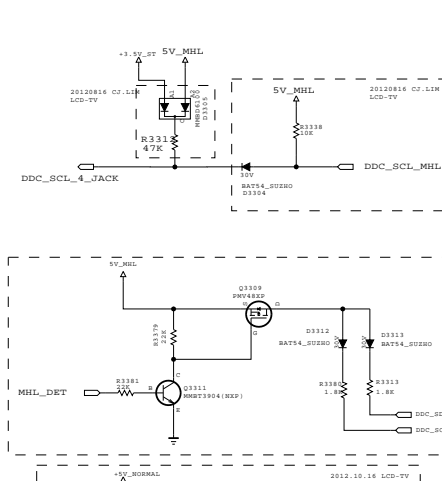
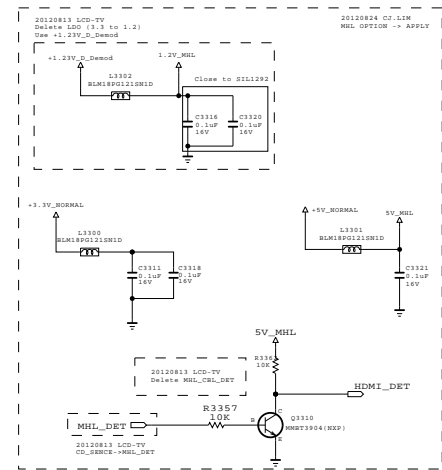
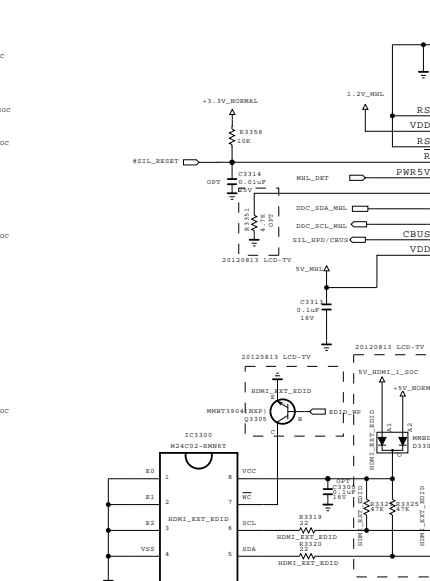
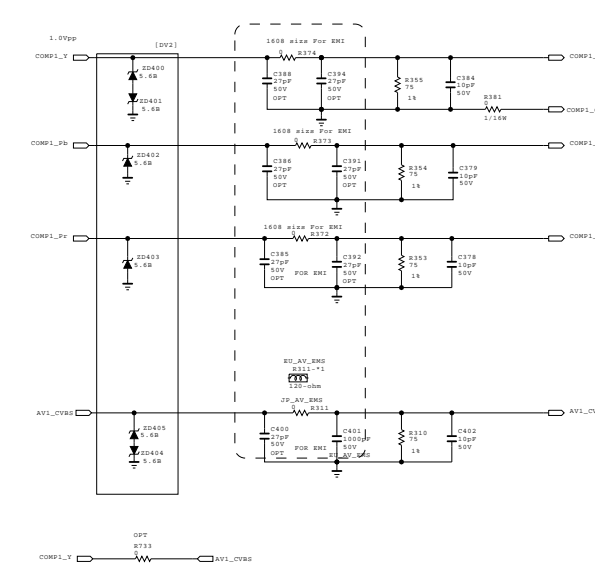
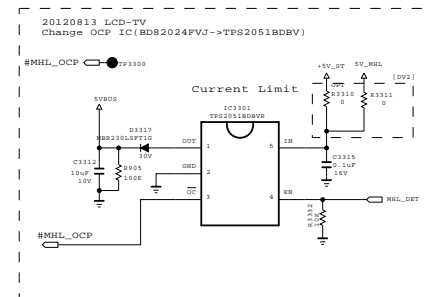
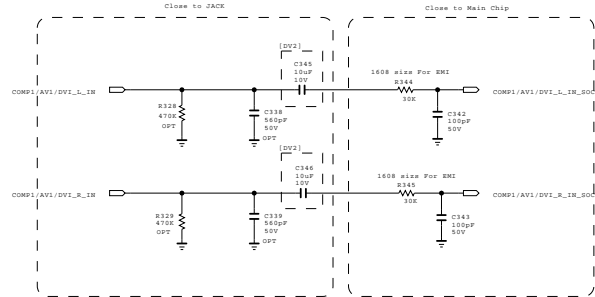
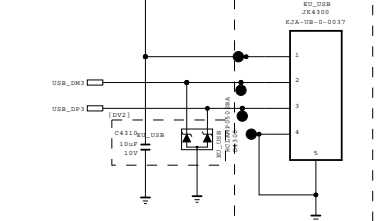
USB2

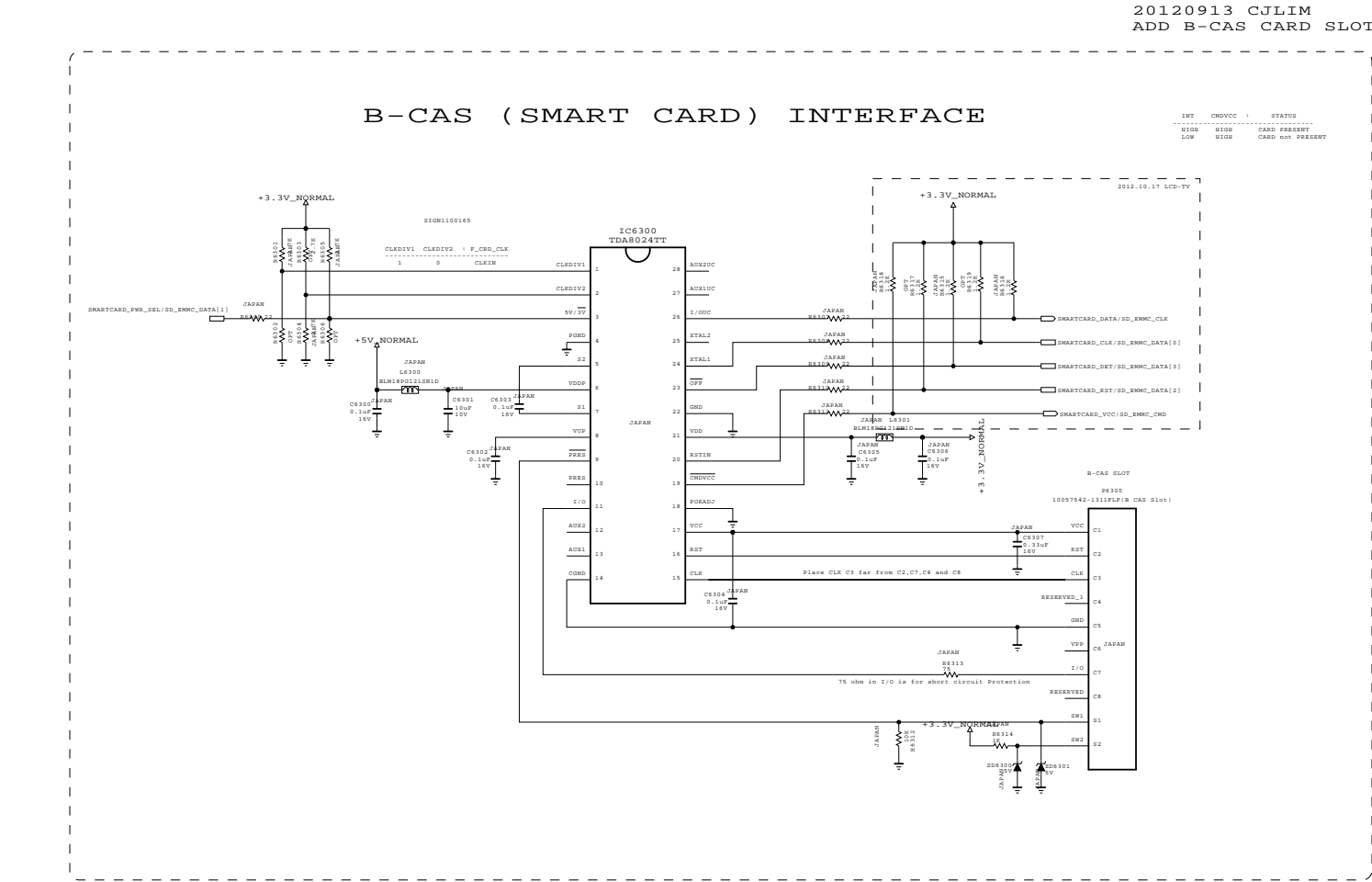
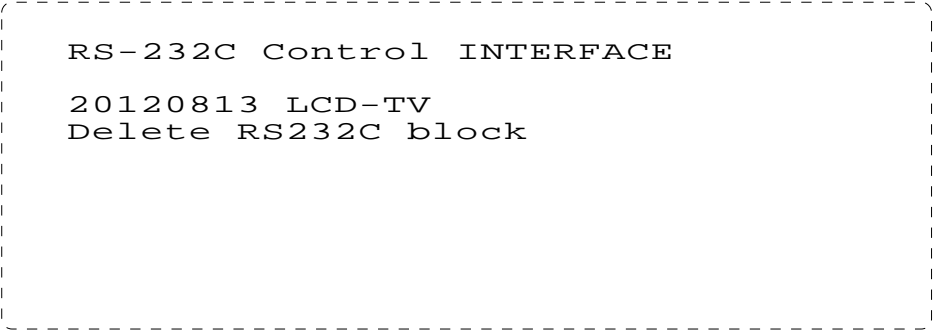
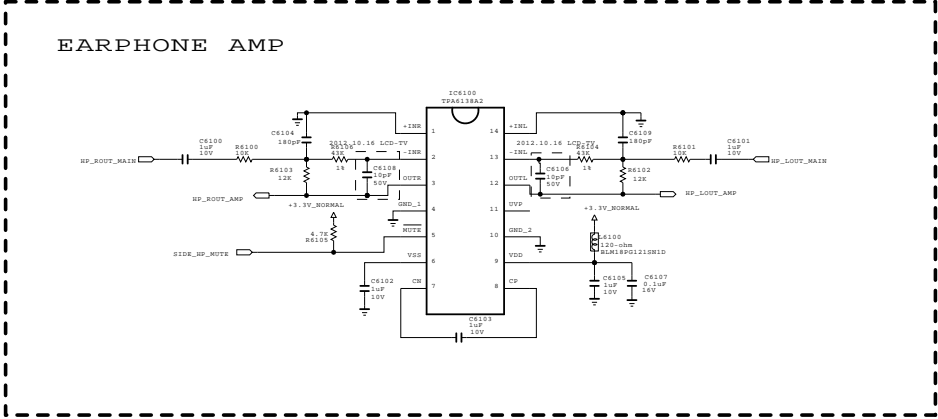
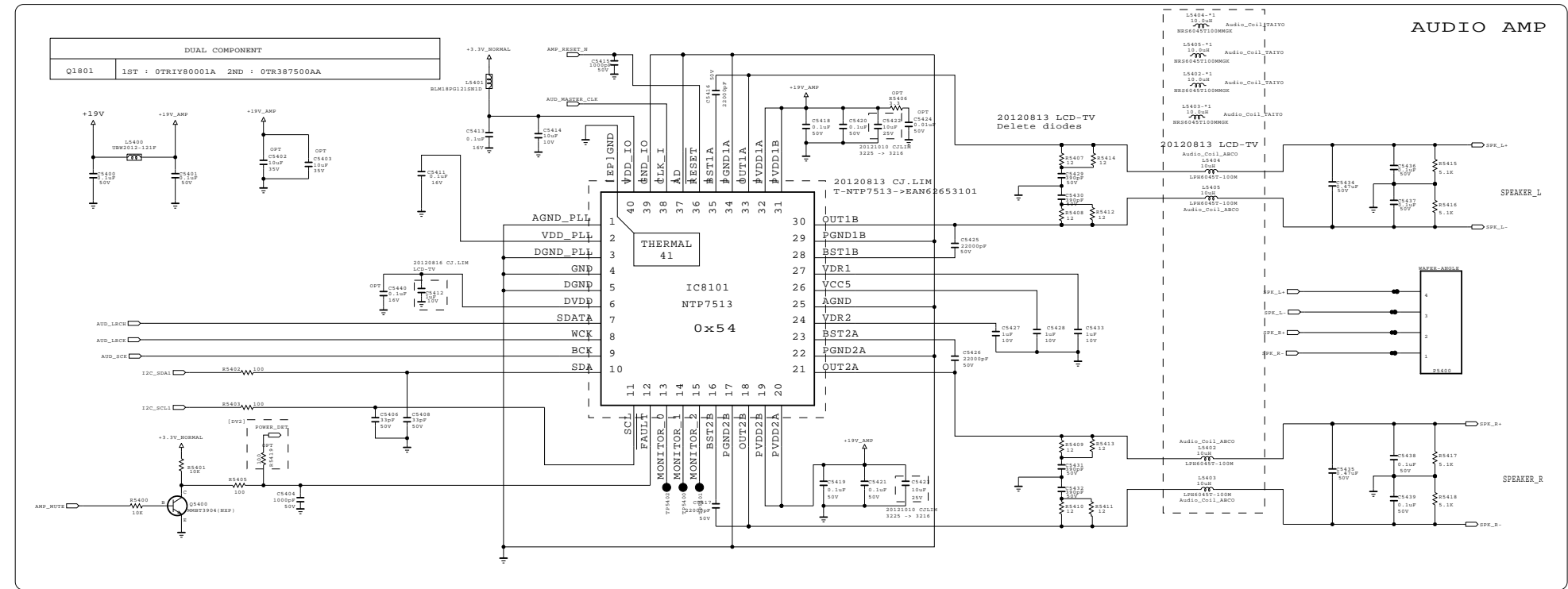
MAX 1.5A



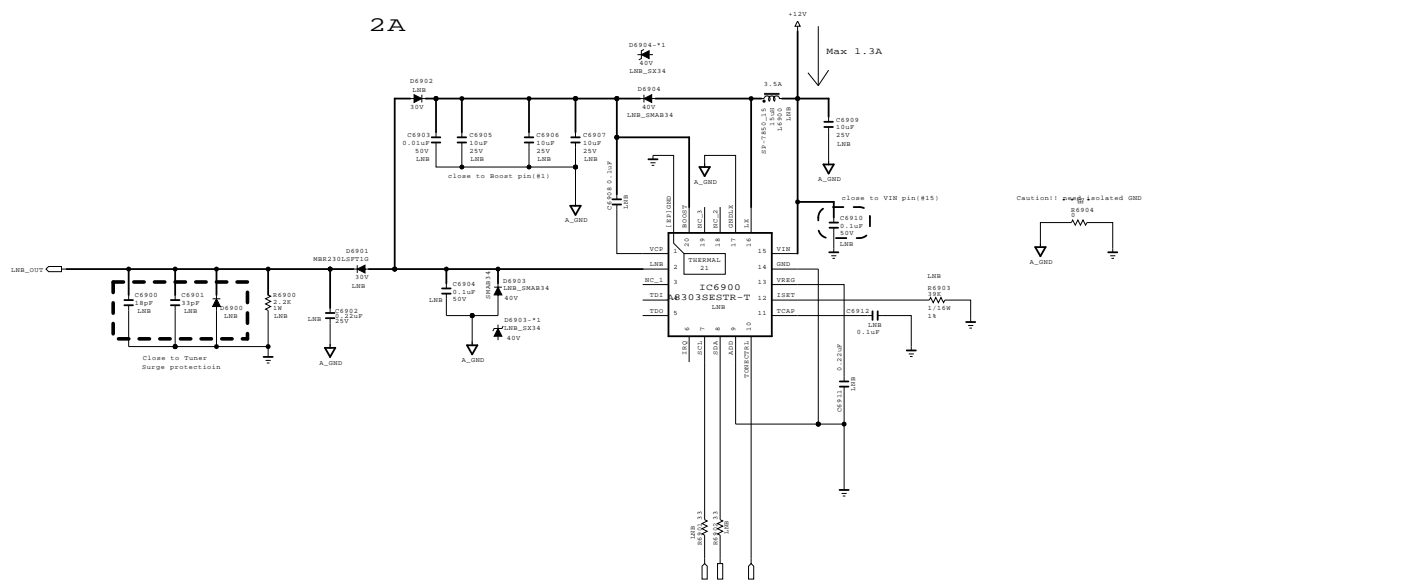
USB3

MAX 1.5A





DVB-S2 LNB Part Allegro
(Option:LNB)



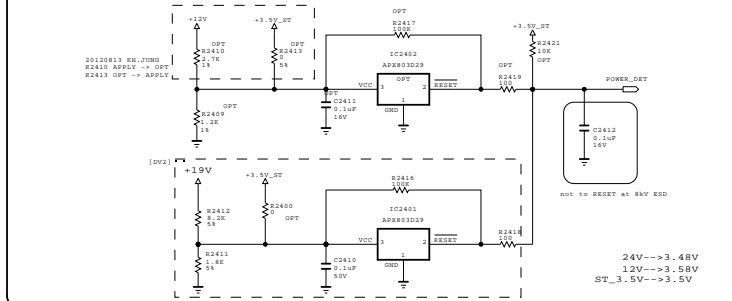
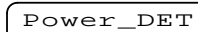
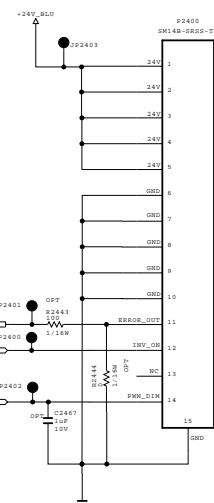
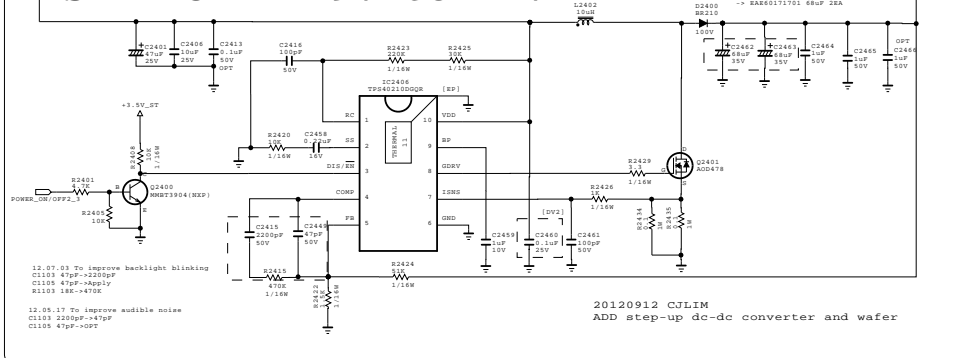
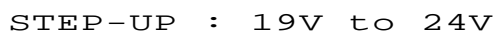
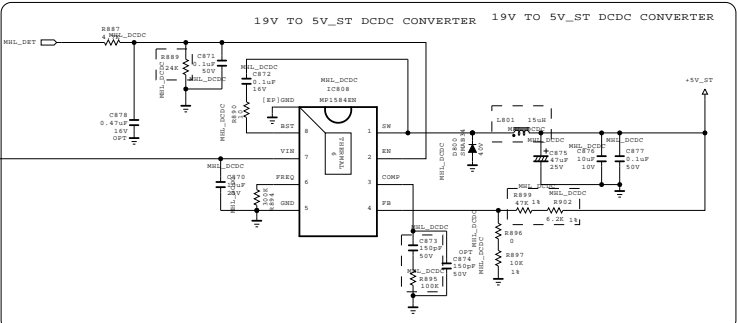
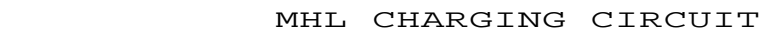
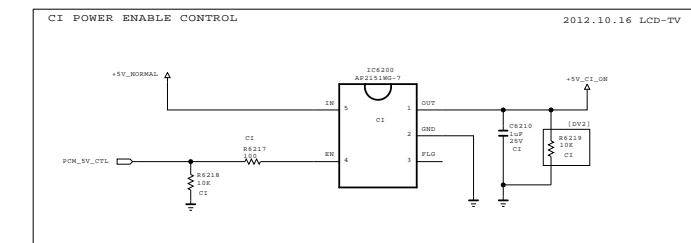
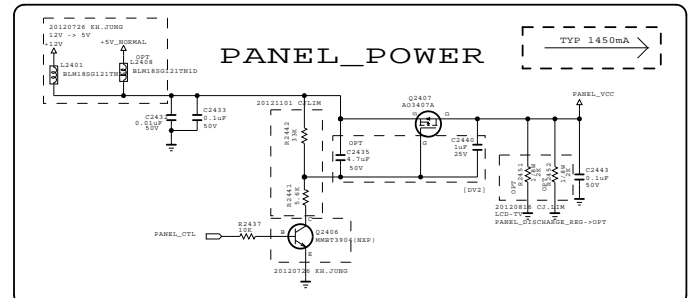
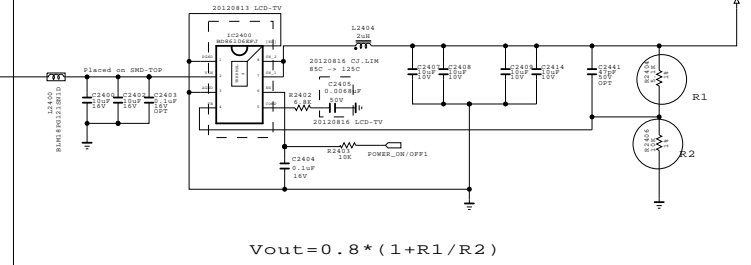
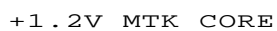
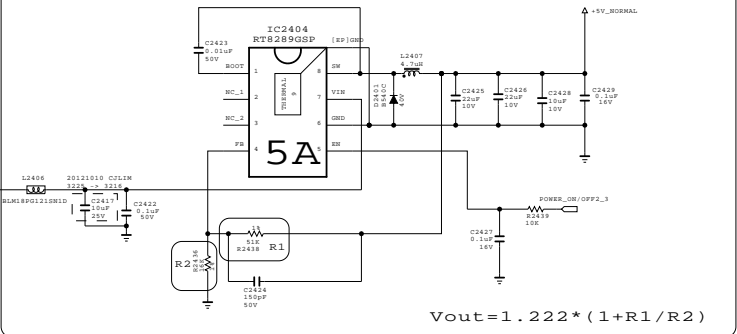
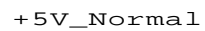
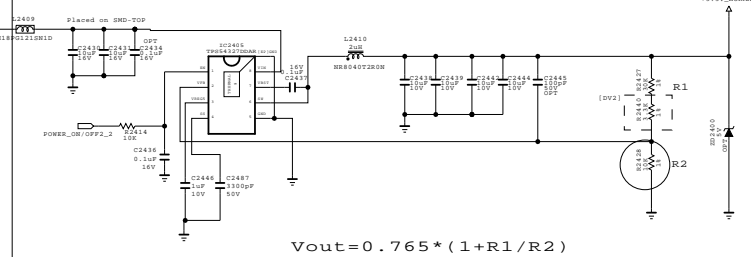
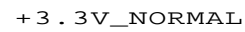
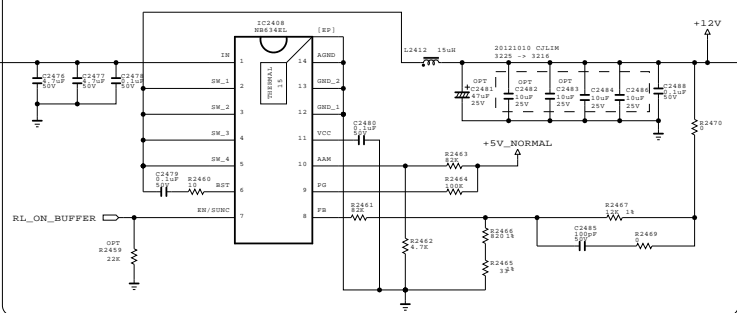
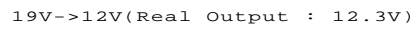
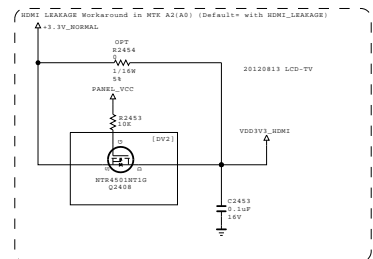
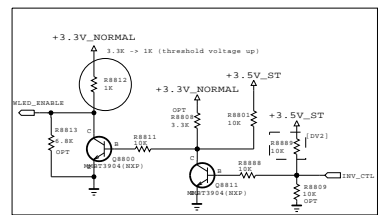
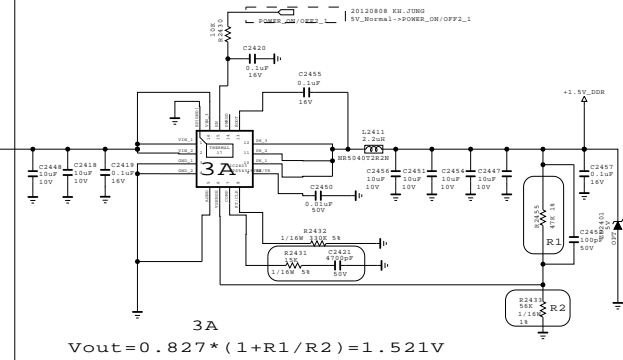
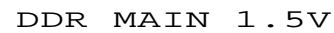
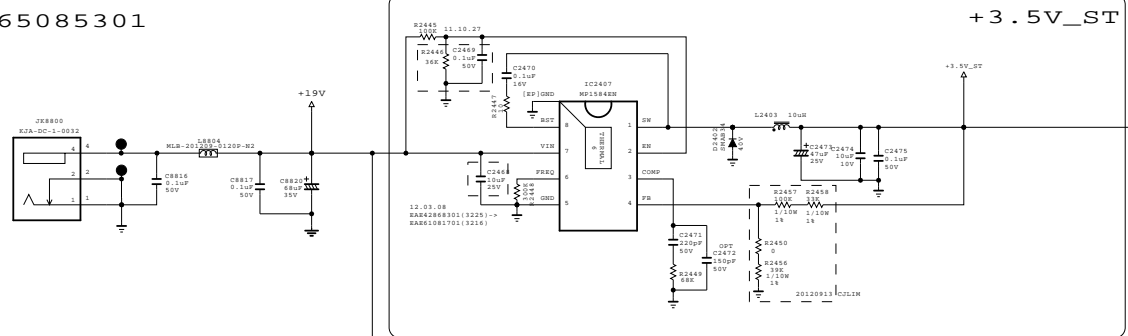
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SECRET
LGElectronics

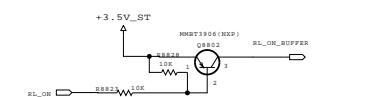
LG ELECTRONICS



MODEL	LN4600	DATE	2013.01.02
BLOCK	AUDIO/HP/LNB/B-CAS	SHEET	5 / 8

EAX65085301



For POLA/ROW LPB Model --> Use P_DET_12V and P_DET_3.5V
For Others(Cinema LPB,EDGE/POLA PSU) --> Use P_DET_12V

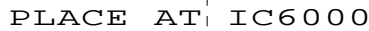


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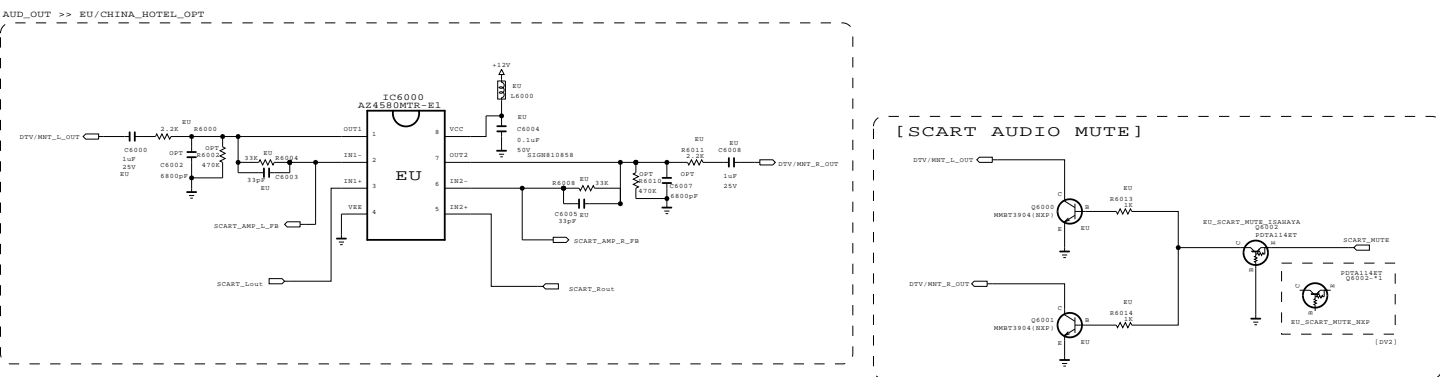
SECRET
LGElectronics

MODEL	LN4600	DATE	2013.01.02
BLOCK	POWER / LED driver	SHEET	6 / 8

PLACE AT MAIN SOC SIDE

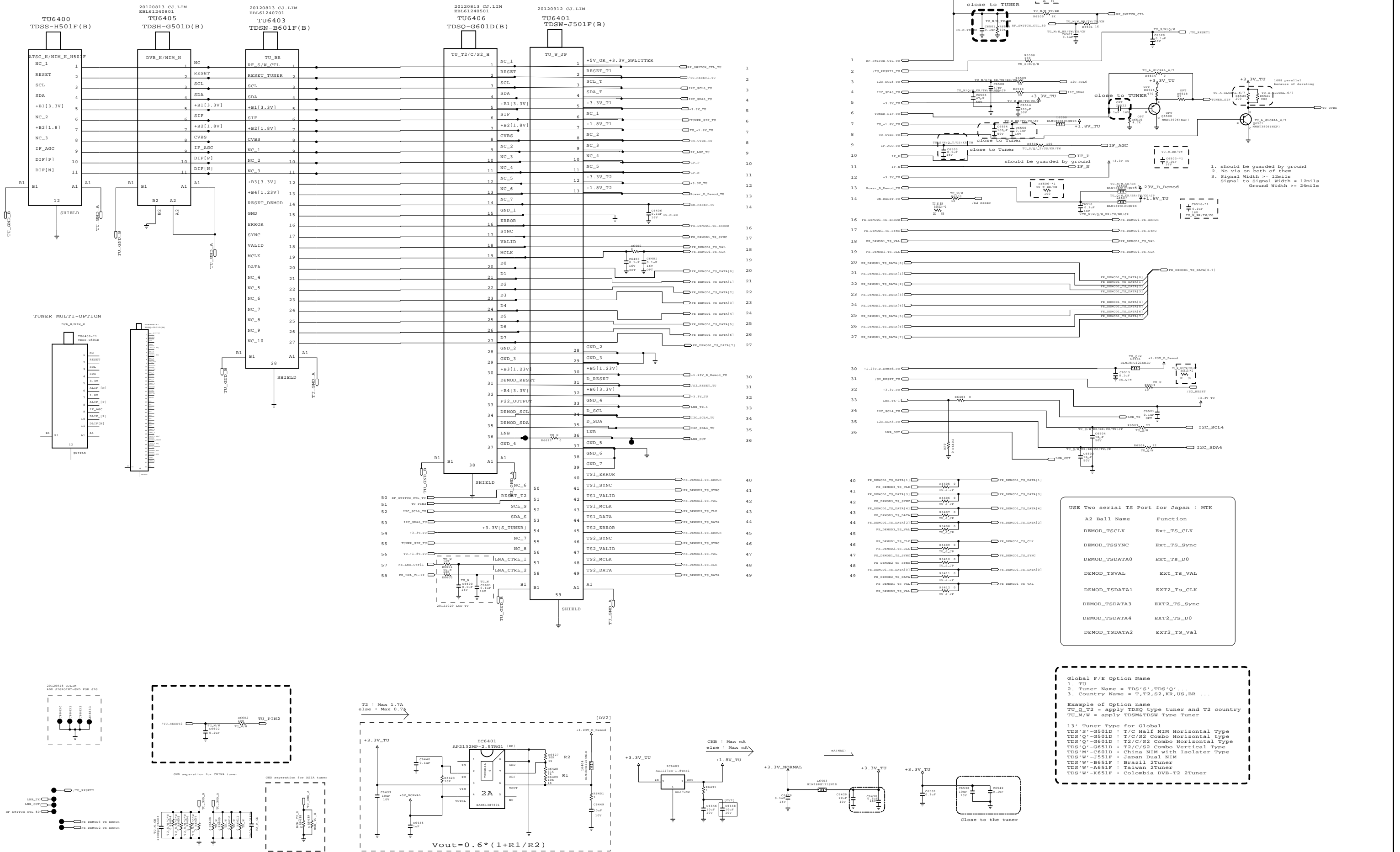


SECTION



SECRET
LGElectronics





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SECRET
LGElectronics

LG ELECTRONICS

MODEL	LN4600	DATE	2013.01.02
BLOCK	TUNER	SHEET	8 / 8

